

Nevada  
Environmental  
Restoration  
Project

DOE/NV--1237



Recommendations and Justifications for  
Modifications for Use Restrictions Established  
under the U.S. Department of Energy,  
National Nuclear Security Administration  
Nevada Site Office  
*Federal Facility Agreement and Consent Order*

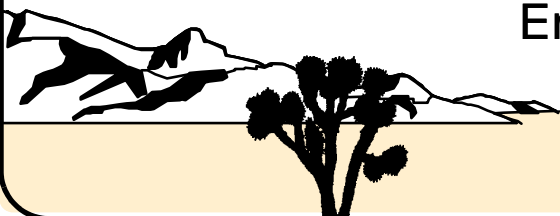
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U.S. Department of Energy  
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National Nuclear Security Administration Nevada Site Office  
*Federal Facility Agreement and Consent Order***

Approved by: /s/ Kevin J. Cabbie

Date: 02/05/2008

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Industrial Sites Sub-Project

Approved by: /s/ John B. Jones

Date: 02/04/2008

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John B. Jones  
Acting Federal Project Director  
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## ***List of Acronyms and Abbreviations***

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Am	Americium
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	Below ground surface
BMP	Best management practice
CADD	Corrective Action Decision Document
CAIP	Corrective Action Investigation Plan
CAS	Corrective Action Site
CAU	Corrective Action Unit
COC	Contaminant of concern
COPC	Contaminant of potential concern
CR	Closure Report
Cs	Cesium
DDD	Dichlorodiphenyl-dichloroethane
DDE	Dichlorodiphenyl-dichlorethylene
DDT	Dichlorodiphenyl-trichloroethane
DOE	U.S. Department of Energy
DQO	Data quality objective
DRO	Diesel-range organics
E-MAD	Engine Maintenance, Assembly, and Disassembly
EPA	U.S. Environmental Protection Agency
Eu	Europium
FAL	Final action level
FD	Field duplicate
FFACO	<i>Federal Facility Agreement and Consent Order</i>

## ***List of Acronyms and Abbreviations*** (continued)

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ft	Foot
ft <sup>2</sup>	Square foot
FTP	Fire Training Pit
gal	Gallon
GRO	Gasoline-range organics
in.	Inch
IS	Industrial Sites
m	Meter
mg/kg	Milligrams per kilogram
mi	Mile
mrem/yr	Millirem per year
NAC	<i>Nevada Administrative Code</i>
NDEP	Nevada Division of Environmental Protection
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NTS	Nevada Test Site
PAL	Preliminary action level
PCB	Polychlorinated biphenyl
pCi/g	Picocuries per gram
ppm	Parts per million
PRG	Preliminary remediation goal
Pu	Plutonium
RBCA	Risk-based corrective action
RCRA	<i>Resource Conservation and Recovery Act</i>
RESRAD	Residual Radioactive
ROTC	Record of Technical Change

## ***List of Acronyms and Abbreviations (continued)***

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SAFER	Streamlined Approach for Environmental Restoration
SNL	Sandia National Laboratories
Sr	Strontium
SSTL	Site-specific target level
SVOC	Semivolatile organic compound
SWS	Septic Waste System
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total petroleum hydrocarbons
TTR	Tonopah Test Range
U	Uranium
UCL	Upper confidence limit
UDP	Underground Discharge Point
UGTA	Underground Test Area
UR	Use restriction
URMA	Underground Radioactive Material Area
UST	Underground storage tank
VCA	Voluntary Corrective Action
VOC	Volatile organic compound
µg/kg	Micrograms per kilogram

## **1.0 Purpose**

---

Many *Federal Facility Agreement and Consent Order* (FFACO) Use Restrictions (URs) have been established at various corrective action sites (CASs) as part of FFACO corrective actions (FFACO, 1996; as amended January 2007). Since the signing of the FFACO in 1996, practices and procedures relating to the implementation of risk-based corrective action (RBCA) have evolved. This document is part of an effort to re-evaluate all FFACO URs against the current RBCA criteria (referred to in this document as the Industrial Sites [IS] RBCA process) as defined in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006c). Based on this evaluation, the URs were sorted into the following categories:

1. Where sufficient information exists to determine that the current UR is consistent with the RCBA criteria
2. Where sufficient information exists to determine that the current UR may be removed or downgraded based on RCBA criteria.
3. Where sufficient information does not exist to evaluate the current UR against the RCBA criteria.

After reviewing all the existing FFACO URs, the 49 URs addressed in this document have sufficient information to determine that these current URs may be removed or downgraded based on RCBA criteria. This document presents recommendations on modifications to existing URs that will be consistent with the RCBA criteria.

## 2.0 Process

---

The evaluations of URs presented in this document will result in one of the following actions:

1. No action because the risk posed by site contamination is appropriately controlled by the current UR.
2. Removal of the current UR because contamination is not present at the site above risk-based final action levels (FALs).
3. Modification of the current UR to appropriately control risks posed by the site.

All FFACO URs are established to protect site workers and the public from inadvertent contact with contaminants of concern (COCs). A COC is defined as any contaminant that exceeds the corresponding FAL. For most of the existing URs, preliminary action levels (PALs) established at the time of the investigation were used for the FALs (e.g., radionuclide PALs were established as background activities). The PALs have been modified since the signing of the FFACO in 1996. Also, many of the URs were established before the IS RBCA process was developed. The IS RBCA process provides a methodology for determining risk-based FALs. The data used to define the need for the original URs were compared to FALs developed using the current IS RBCA process to re-evaluate the need for a UR and, if needed, the type of UR.

Standard URs (referred to as URs) and administrative URs are the two types of URs that can be established. Administrative URs differ from standard URs in that they do not require onsite postings (i.e., signs) or other physical barriers (e.g., fencing, monuments), and they do not require periodic inspections (see Section 6.2 of the *Industrial Sites Project Establishment of Final Action Levels* [NNSA/NSO, 2006c]). Administrative URs are applicable to sites where the “Remote Work Area” or “Occasional Use Area” future land-use scenarios are used to calculate a FAL. The administrative UR is used in these circumstances to protect workers from future work activities that would cause an exposure exceeding that used in the calculation of the FAL (e.g., in the event a building is later planned at the location, changing the land use to the “Industrial Area”). This administrative UR would establish the exposure assumption used in the FAL calculation as the exposure limits for the UR. Any proposed activity within this use restricted area that would potentially cause an exposure exceeding the exposure limits would require approval from the Nevada Division of Environmental Protection (NDEP).



## 2.1 Scope

The 49 URs addressed in this document are listed in [Table 2-1](#) and meet the following criteria:

- The size and depth of the contaminant plume have been adequately defined.
- Where the UR basis included total petroleum hydrocarbons (TPH) contamination, both volatile organic compound (VOC) and semivolatile organic compound (SVOC) results are available for the samples with the maximum TPH concentrations.

**Table 2-1**  
**Use Restrictions**  
(Page 1 of 2)

CAU	CAS	Description	Recommended Modification
34	03-09-06	Mud Disposal Crater	Remove UR
	03-09-07	Mud Pit	Remove UR
214	25-23-01	Contaminated Materials	Remove UR
	25-23-19	Radioactive Material Storage	Remove UR
262	25-05-06	Leachfield	Remove UR
271	27-05-02	Leachfield	Administrative UR
321	22-99-05	Fuel Storage Area	Remove UR
322	01-25-01	AST Release	Remove UR
	03-25-03	Mud Plant AST Diesel Release	Remove UR
335	06-20-02	20-inch Cased Hole	Remove UR
	06-23-03	Drain Pit	Remove UR
342	23-56-01	Former Mercury Fire Training Pit	Remove UR
355	02-37-01	Cellar & Mud Pit	Remove UR
	02-37-03	Cellar & Mud Pit	Remove UR
	02-37-04	Cellar & Mud Pit	Remove UR
	02-37-05	Cellar & Mud Pit	Remove UR
	02-37-06	Cellar & Mud Pit	Remove UR
	02-37-07	Cellar & Mud Pit	Remove UR
	02-37-10	Cellar & Mud Pit	Remove UR
	02-37-11	Cellar & Mud Pit	Remove UR
	02-37-12	Cellar & Mud Pit	Remove UR
	02-37-13	Cellar & Mud Pit	Remove UR

**Table 2-1**  
**Use Restrictions**  
(Page 2 of 2)

Corrective Action Unit	Corrective Action Site	Description	Recommended Modification
355	02-37-14	Cellar & Mud Pit	Remove UR
	02-37-15	Cellar & Mud Pit	Remove UR
	02-37-16	Cellar & Mud Pit	Remove UR
	02-37-17	Cellar	Remove UR
	02-37-18	Cellar & Tanks	Remove UR
356	03-04-01	Area 3 Change House Septic System	Remove UR
	03-09-04	Mud Pit	Remove UR
358	20-23-02	Postshot Cellar	Remove UR
	20-23-03	Cellar	Remove UR
	20-23-04	Postshot Cellar	Remove UR
	20-23-05	Postshot Cellar	Remove UR
	20-23-06	Cellar	Remove UR
	20-37-01	Cellar & Mud Pit	Remove UR
	20-37-05	Cellar	Remove UR
394	12-25-04	UST 12-16-2 Waste Oil Release	Remove UR
	18-25-01	Oil Spills	Remove UR
	18-25-02	Oil Spills	Remove UR
	18-25-03	Oil Spill	Remove UR
	29-44-01	Fuel Spill	Remove UR
398	25-25-17	Subsurface Hydraulic Oil Spill	Remove UR
404	TA-03-001-TARC	Roller Coaster Lagoons	Administrative UR
	TA-21-001-TARC	Roller Coaster N. Disposal Trench	Administrative UR
423	03-02-002-0308	Underground Discharge Point	Remove UR
427	03-05-002-SW02	Septic Waste System	Remove UR
	03-05-002-SW06	Septic Waste System	Remove UR
429	03-51-001-0355	Photo Shop UDP, Drains	Remove UR
454	12-25-09	Spill 960722-02 (from UST 12-B-3)	Remove UR

AST = Aboveground storage tank.  
UDP = Underground Discharge Point  
UR = Use restriction

Table 2-1 also includes the recommended modifications to each UR. These sites are addressed in Sections 3.0 through 27.0 to include the following information:

- The CAS description as listed in the FFACO database.
- The current UR description as listed in the corresponding FFACO closure document.
- The basis for current UR, as listed in the corresponding FFACO closure document, including the analytical results driving the decision.
- The basis for UR modification based on the current RBCA process.

## 2.2 Action Levels

The current IS RBCA process used to establish FALs is described in the *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006c). This process conforms to *Nevada Administrative Code* (NAC) Section 445A.227 (NAC, 2006a), which lists the requirements for sites with soil contamination. For the evaluation of corrective actions, NAC Section 445A.22705 (NAC, 2006b) recommends the use of American Society for Testing and Materials (ASTM) Method E 1739 (ASTM, 1995) to “conduct an evaluation of the site, based on the risk it poses to public health and the environment, to determine the necessary remediation standards (i.e., FALs) or to establish that corrective action is not necessary.”

This RBCA process defines three tiers (or levels) of evaluation involving increasingly sophisticated analyses:

- Tier 1 evaluation – Sample results from source areas (highest concentrations) are compared to action levels based on generic (non-site-specific) conditions (i.e., PALs). The FALs may then be established as the Tier 1 action levels, or the FALs may be calculated using a Tier 2 evaluation.
- Tier 2 evaluation – Conducted by calculating Tier 2 site-specific target levels (SSTLs) using site-specific information as inputs to the same or similar methodology used to calculate Tier 1 action levels. The Tier 2 SSTLs are then compared to individual sample results from reasonable points of exposure (as opposed to the source areas as is done in Tier 1) on a point-by-point basis. Total TPH concentrations will not be used for risk-based decisions under Tier 2 or Tier 3. Rather, the individual COCs will be compared to the SSTLs.
- Tier 3 evaluation – Conducted by calculating Tier 3 SSTLs on the basis of more sophisticated risk analyses using methodologies described in Method E 1739-95 that consider site-, pathway-, and receptor-specific parameters.

The comparison of laboratory results to the revised FALs is used to evaluate the need for and the type of UR at each site. The revised FALs are defined (along with the basis for their definition) in each of the subsequent UR sections.

### **2.2.1 Tier 1-Based FALs**

All FALs based on a Tier 1 evaluation were defined as the PALs listed in the following subsections.

#### **2.2.1.1 Chemical PALs**

Except as noted herein, the chemical PALs are defined as the U.S. Environmental Protection Agency (EPA) *Region 9 Risk-Based Preliminary Remediation Goals (PRGs)* for chemical contaminants in industrial soils (EPA, 2004). Background concentrations for *Resource Conservation and Recovery Act* (RCRA) metals and zinc will be used instead of PRGs when natural background concentrations exceed the PRG, which is often the case with arsenic on the Nevada Test Site (NTS). Background is considered the average concentration plus two standard deviations of the average concentration for sediment samples collected by the Nevada Bureau of Mines and Geology throughout the Nevada Test and Training Range (formerly the Nellis Air Force Range) (NBMG, 1998; Moore, 1999). For detected chemical contaminants of potential concern (COPCs) without established PRGs, the protocol used by the EPA Region 9 in establishing PRGs (or similar) will be used to establish PALs. If used, this process will be documented in the investigation report.

#### **2.2.1.2 Total Petroleum Hydrocarbon PALs**

The PAL for TPH is 100 parts per million (ppm) as listed in NAC 445A.2272 (NAC, 2006c).

#### **2.2.1.3 Radionuclide PALs**

The PALs for radiological contaminants (other than tritium) are based on the National Council on Radiation Protection and Measurements Report No. 129 recommended screening limits for construction, commercial, and industrial land-use scenarios (NCRP, 1999) scaled to a 25-millirem-per-year (mrem/yr) dose constraint (Murphy, 2004) and the generic guidelines for residual concentration of radionuclides in U.S. Department of Energy (DOE) Order 5400.5 (DOE, 1993). These PALs are based on the construction, commercial, and industrial land-use scenarios provided in the guidance and are appropriate for the NTS based on future land use scenarios (NCRP, 1999). The PAL for tritium is based on the Underground Test Area (UGTA)

Project limit of 400,000 picocuries per liter for discharge of water containing tritium (NNSA/NV, 2002c).

### **2.2.2 Tier 2-Based FALs**

All FALs established based on a Tier 2 evaluation were calculated using one of the following site-specific exposure scenarios, as defined in the IS RBCA (NNSA/NSO, 2006c):

- Industrial Area – Worker will be exposed to the site full time (225 days per year, 10 hours per day for 25 years). This exposure scenario is for sites where workers are present full-time (e.g., a site located at Mercury).
- Remote Work Area – Worker will be exposed to the site part-time (up to 336 hours per year for 25 years). This exposure scenario is for sites where workers are present part-time (e.g., a site located near a substation that workers might visit for inspection and maintenance).
- Occasional Use Area – Worker will be exposed to the site occasionally (up to 80 hours per year for 5 years). This exposure scenario is for sites where workers are present occasionally (e.g., an open desert area with no facilities or regular work areas).

The Tier 2 SSTLs are compared to individual sample results from reasonable points of exposure (as opposed to the source areas as is done in Tier 1) on a point-by-point basis. Tier 2-based FALs do not include an action level for petroleum hydrocarbon as a whole (e.g., TPH). Instead, the risk posed by TPH (not yet established) is addressed as the risk posed by the individual hazardous constituents of TPH present at the site.

The following COPCs are defined as the hazardous constituents of TPH diesel:

- 1,3,5-Trimethylbenzene
- 2-Methylnaphthalene
- Benzo(a)anthracene
- Benzene
- Benzo(a)pyrene
- Ethylbenzene
- Naphthalene
- Toluene
- Xylenes
- n-Butylbenzene
- n-Propylbenzene
- Benzo(k)fluoranthene
- Benzo(b)fluoranthene

- Fluorene
- Phenanthrene
- Fluoranthene
- Pyrene
- Chrysene
- Anthracene
- Benzo(g,h,i)perylene

The following COPCs are defined as the hazardous constituents of TPH gasoline:

- Benzene
- Ethylbenzene
- Toluene
- Xylenes

The hazardous constituents of TPH diesel and TPH gasoline are included in the list of reported analytical results from the VOC and SVOC analytical methods. Therefore, when all SVOC and VOC analyte results are below PALs, TPH diesel and TPH gasoline can be considered to be below PALs.

### **2.2.3 Tier 3-Based FALs**

If appropriate, a Tier 3 evaluation may be conducted by calculating Tier 3 SSTLs on the basis of more sophisticated risk analyses using methodologies described in Method E 1739-95, such as Groundwater Modeling System software (BYU, 1999), that consider site-, pathway-, and receptor-specific parameters. Tier 3 evaluation is much more complex than Tier 1 and 2 evaluations because it may include additional site characterization, probabilistic evaluations, and sophisticated chemical fate/transport models. The Tier 3 SSTLs are then compared to the 95 percent upper confidence limit (UCL) of the mean of sample results, from the points of compliance, as defined in ASTM Method E 1739-95. Contaminant concentrations or activities exceeding Tier 3 SSTLs require corrective action. If a Tier 3 evaluation is conducted, the calculations used to derive the SSTLs and the UCL of the means will be provided as an appendix to the report.

No FALs were established based on a Tier 3 evaluation for the CASs described in this document.

### **2.2.4 Multiple Constituent Analysis**

Any nonradionuclide FAL based on a Tier 2 or Tier 3 evaluation will also be subject to an evaluation of additive risk to the receptor by multiple constituents at sites where contamination

exceeds PALs, but does not exceed FALs. This will address a potential situation where all constituents present at a site are below the individual FALs (and, therefore, the data decision may otherwise be that no further action is required), but the additive effect of multiple constituents may pose an unacceptable risk to the receptor. This assessment will be identified in the UR Modification Proposal as a multiple constituent analysis. When required, a multiple constituent analysis will be conducted, as defined in *Industrial Sites Project Establishment of Final Action Levels*, for carcinogenic risk and/or toxicity using all of the constituents exceeding risk-based screening levels that have either a slope factor or a reference dose (i.e., that are either carcinogenic or toxic) (NNSA/NSO, 2006c).

A multiple constituent analysis will not be conducted for radioactive dose because the Residual Radioactive (RESRAD) computer code back-calculates SSTLs, from total dose to the receptor, based on the combination of radioactive constituents present at the site.

A multiple constituent analysis will be conducted by summing the ratios of each constituent concentration exceeding a PAL to their corresponding Tier 2 or Tier 3 carcinogenic- or toxicity-based FAL. If the sum of the ratios exceeds 1.0, then the data quality objective (DQO) decision will be modified to corrective action required. Any multiple constituent analyses that were conducted are identified in the CAS-specific sections.

### **2.3 Modified Use Restriction Decision Basis**

The recommendation to modify the UR will be based on the following decision statements:

- If the site contains a contaminant exceeding a FAL, based on the site-specific foreseeable future land-use exposure scenario (see [Section 2.2.2](#)), the current FFACO UR will remain.

Otherwise:

- If the site does not contain a contaminant exceeding a FAL, based on the site-specific exposure scenario, the UR will be removed.

Otherwise:

- If the site contains a contaminant exceeding a FAL, based on the Industrial Area exposure scenario, an administrative UR will be implemented. Changing to an administrative UR would eliminate ongoing inspection and maintenance requirements (e.g., no requirement for fencing or signage), and would allow worker access to the site for temporary or intermittent site uses, based on the site-specific exposure scenario.

## **2.4 Modification of Use Restrictions**

All FFACO URs were established in an approved FFACO closure document (e.g., Corrective Action Decision Document [CADD]/Closure Report [CR] or CR).

Changes to approved FFACO documents are in the form of an addendum, an errata sheet, or Record of Technical Change (ROTC). Addenda are used when extensive corrections/additions to a section or multiple sections of an FFACO document are necessary.

Approval of this document will constitute approval of the UR modifications recommended for each UR addressed herein. Following approval, an addendum to each of the associated closure documents (that originally established each UR) will be prepared and submitted as DOE, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) FFACO records. These addenda will consist of:

- A cover page referring the reader to this document for additional information.
- The cover and signature pages of this document.
- The NDEP approval letter.
- The corresponding section of this document.

As applicable, requirements for inspecting and maintaining the modified URs will be lifted, and the postings and signage, at each site specific to the FFACO UR, will be removed. Fencing and posting may be present at these sites that are unrelated to the FFACO UR, such as for radiological control purposes, as required by the *NV/YMP Radiological Control Manual* (NNSA/NSO, 2004f). Modification of any UR will not affect or modify requirements for fencing, posting, or monitoring at any of these sites.



### **3.0 CAU 34, CAS 03-09-06 – Mud Disposal Crater**

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#### **3.1 CAS Description**

The Mud Disposal Crater is located approximately 25 feet (ft) north of the Area 3 Mud Plant Building, approximately 24 miles (mi) north of Mercury, Nevada, and east of Mercury Highway on Road 3-03. The Mud Disposal Crater received drilling waste and excess mud from the mud plant. The crater is approximately 314 ft in diameter, 42 ft deep, and was created by a 1962 underground nuclear detonation called the Chinchilla test. Later in 1962, after the test, the crater was used to mix and store mud. After 1962, the crater was used for disposal; receiving waste from Baker tanks, vacuum trucks, and the mud plant. The Mud Disposal Crater also received wastewater from the mud plant floor drains and from cleaning and flushing of mix tanks. The crater received exotic mud mixtures, including asbestos and chromate muds, used for experimentation at the mud plant between 1970 and 1972. Sometime between 1992 and 1994, the disposal of used mud and wastewater ceased (DOE/NV, 2001a).

#### **3.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the Corrective Action Unit (CAU) CR or other CAU documentation unless appropriate concurrence is obtained in advance. There are no annual monitoring or inspection requirements associated with the UR (NNSA/NV, 2002b).

#### **3.3 Basis for Current Use Restriction**

Samples were analyzed for TPH diesel-range organics (DRO), total VOCs, total SVOCs, total RCRA metals, polychlorinated biphenyls (PCBs), isotopic uranium (U), isotopic plutonium (Pu), strontium (Sr)-90, americium (Am)-241, and gamma spectroscopy. The analytical results for soil samples collected at the Mud Disposal Crater indicated the presence of TPH (DRO) contamination exceeding the NDEP action level of 100 milligrams per kilogram (mg/kg) at five locations. No VOCs or SVOCs were detected above PALs. Arsenic was detected above the PAL of 2.7 mg/kg in 25 of the 30 samples analyzed, but all concentrations were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. The radionuclides Am-241, U-235, Pu-238, and Pu-239/240 exceeded their respective PALs. The PALs for the radionuclides were established in the Corrective Action

Investigation Plan (CAIP) as any activity distinguishable from undisturbed background activity (DOE/NV, 2001a).

Table 3-1 contains analytical results of all COCs at CAS 03-09-06 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 3-1**  
**Sample Results for COCs at CAS 03-09-06**  
**Used To Establish Current Use Restriction**

Sample ID	Depth (ft bgs)	TPH (DRO)	Am-241	U-235	Pu-238	Pu-239/240
		PAL 100 mg/kg	PAL 0.05 pCi/g	PAL 0.07 pCi/g	PAL 0.05 pCi/g	PAL 0.106 pCi/g
DC0101	1 - 2	--	0.94 ± 0.17	--	0.113 ± 0.039	5.97 ± 0.85
DC0205	5 - 7	180	--	--	--	--
DC0208	8 - 10	--	0.94 ± 0.18	--	0.085 ± 0.034	7 ± 1.0
DC0300	0 - 0.5	110	--	--	--	--
DC0606	6.5 - 7.5	--	0.81 ± 0.16	--	0.139 ± 0.045	6.61 ± 0.95
DC0799	1 - 6	190	--	--	--	--
DC0911	11.5 - 12.5	--	0.97 ± 0.18	--	0.078 ± 0.032	7.1 ± 1.0
DC1102	2.5 - 3.5	5,300 (J)	--	--	--	--
DC1104	4.5 - 5.5	8,000 (J)	--	--	--	--
DC1211	11 - 13	--	0.255 ± 0.069	--	--	1.65 ± 0.27
DC0799	1 - 6	--	0.07 ± 0.025 (J)	0.145 ± 0.052	--	0.38 ± 0.086

Am = Americium  
bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

J = Estimated value  
-- = No detects above action levels

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
pCi/g = Picocuries per gram  
Pu = Plutonium  
TPH = Total petroleum hydrocarbons  
U = Uranium

### 3.4 Basis for Use Restriction Modification

The revised FALs for radionuclides listed in Table 3-2 were established based on the PALs presented in Section 2.2.1. The revised FALs associated with the TPH contamination were established based on the PALs of the hazardous constituents of TPH (DRO) described in Section 2.2.2. Hazardous constituents of TPH were not detected in any of the samples at concentrations greater than their respective PALs (DOE/NV, 2001a). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs. All revised FALs were established at the PAL concentrations.

Table 3-2 presents the sample results that are the basis for the current UR and demonstrate that no results exceed the revised FALs.

**Table 3-2**  
**Revised Final Action Levels for CAS 03-09-06**

Sample ID	Depth (ft bgs)	Am-241	U-235	Pu-238	Pu-239
		Revised FAL 12.7 pCi/g	Revised FAL 17.6 pCi/g	Revised FAL 13 pCi/g	Revised FAL 12.7 pCi/g
DC0101	1 - 2	0.94 ± 0.17	--	0.113 ± 0.039	5.97 ± 0.85
DC0208	8 - 10	0.94 ± 0.18	--	0.085 ± 0.034	7 ± 1.0
DC0606	6.5 - 7.5	0.81 ± 0.16	--	0.139 ± 0.045	6.61 ± 0.95
DC0911	11.5 - 12.5	0.97 ± 0.18	--	0.078 ± 0.032	7.1 ± 1.0
DC1211	11 - 13	0.255 ± 0.069	--	--	1.65 ± 0.27
DC0799	1 - 6	0.07 ± 0.025 (J)	0.145 ± 0.052	--	0.38 ± 0.086

Am = Americium  
bgs = Below ground surface  
FAL = Final action level  
ft = Foot

ID = Identification  
pCi/g = Picocuries per gram  
Pu = Plutonium  
U = Uranium

J = Estimated value  
-- = No detects above original action levels

### 3.5 Proposed Modification

Remove the FFACO UR and associated fencing and postings from this CAS.

## **4.0 CAU 34, CAS 03-09-07 – Mud Pit**

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### **4.1 CAS Description**

Corrective Action Site 03-09-07, Mud Pit, is located south of the Area 3 camp and north of the U3gd crater. The Mud Pit possibly received pre- and post-test drill waste and drill yard waste. The site consists of a mud pit approximately 315 by 245 ft with an approximate 100-by-40-ft internal bermed area at the northeast corner of the large pit. The interior bermed area was used for disposal of excess mud from washing drilling equipment, specifically Baker and Shaker tanks. The mud pit was used for disposal from 1968 to sometime before 1974, at which time the U3ag crater (CAS 03-09-06) was used for excess mud disposal. The mud pit is currently inactive (DOE/NV, 2001a).

### **4.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. There are no annual monitoring or inspection requirements associated with the UR (NNSA/NV, 2002b).

### **4.3 Basis for Current Use Restriction**

Samples were analyzed for TPH (DRO), total VOCs, total SVOCs, total RCRA metals, PCBs, isotopic U, isotopic Pu, Sr-90, Am-241, and gamma spectroscopy. No VOCs or SVOCs were detected above PALs. The analytical results for soil samples collected at the Mud Pit indicated the presence of TPH (DRO) contamination exceeding the NDEP action level of 100 mg/kg at 12 locations, and the presence of TPH gasoline-range organics (GRO) contamination exceeding the NDEP action level of 100 mg/kg at one location. Arsenic was detected above the PAL of 2.7 mg/kg in 44 of the 46 samples analyzed, but all concentrations were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. The radionuclides Am-241, europium (Eu)-152, U-235, Pu-238, and Pu-239/240 exceeded their respective PALs. The PALs for the radionuclides were established in the CAIP as any activity distinguishable from undisturbed background activity (DOE/NV, 2001a).

Table 4-1 contains analytical results of all COCs at CAS 03-09-07 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 4-1**  
**Sample Results for COCs at CAS 03-09-07**  
**Used To Establish Current Use Restriction**  
(Page 1 of 2)

Sample ID	Depth (ft bgs)	TPH (DRO)	TPH (GRO)	Am-241	Eu-152	U-235	Pu-238	Pu-239/240
		PAL 100 mg/kg	PAL 100 mg/kg	PAL 0.05 pCi/g	PAL Not Identified	PAL 0.07 pCi/g	PAL 0.05 pCi/g	PAL 0.106 pCi/g
MP0108	8 - 10	--	--	--	1.25 ± 0.48 (J)	--	--	--
MP0500	0 - 0.5	--	--	--	6.1 ± 1.2	--	--	--
MP0507	7.5 - 9.5	140	--	--	--	--	--	--
MP0600	0 - 1	--	--	0.212 ± 0.066 (J)	1.97 ± 0.48	0.079 ± 0.036	0.193 ± 0.053	1.16 ± 0.19
MP0601	1 - 3	48,000 (J)	1,800	--	--	--	--	--
MP0703	3 - 5	11,000 (J)	--	--	--	--	--	--
MP0800	0 - 0.5	--	--	2.00 ± 0.72	--	--	--	0.43 ± 0.09
MP0808	8 - 10	2,300	--	--	--	--	--	--
MP0900	0 - 1	--	--	0.125 ± 0.032 (J)	1.26 ± 0.45 (J)	0.072 ± 0.038	--	0.18 ± 0.05
MP1001	1 - 3	290	--	--	--	--	--	--
MP1103	3 - 5	930	--	--	--	--	--	--
MP1200	0 - 1	210	--	0.066 ± 0.022 (J)	--	--	--	0.37 ± 0.08
MP1203	3 - 5	130	--	--	--	--	--	--
MP1400	0 - 0.5	--	--	--	2.61 ± 0.62	0.103 ± 0.041	--	0.29 ± 0.08
MP1401	1 - 3	1,700	--	--	2.77 ± 0.65	--	--	--
MP1499	0 - 0.5	--	--	--	2.55 ± 0.64	--	--	--
MP1504	4 - 6	5,300	--	--	--	--	--	--
MP1601	1 - 3	3,300	--	--	1.72 ± 0.59 (J)	--	--	--
MP1603	3 - 5	200	--	--	1.95 ± 0.58	--	--	--
MP1708	8 - 10	--	--	--	3.95 ± 0.91	--	--	--

**Table 4-1**  
**Sample Results for COCs at CAS 03-09-07**  
**Used To Establish Current Use Restriction**  
(Page 2 of 2)

Sample ID	Depth (ft bgs)	TPH (DRO)	TPH (GRO)	Am-241	Eu-152	U-235	Pu-238	Pu-239
		PAL 100 mg/kg	PAL 100 mg/kg	PAL 0.05 pCi/g	PAL Not Identified	PAL 0.07 pCi/g	PAL 0.05 pCi/g	PAL 0.106 pCi/g
MP1711	11 - 13	--	--	--	2.85 ± 0.63	--	--	--
MP1907	7 - 9	--	--	0.96 ± 0.39	--	--	--	0.19 ± 0.055
MP2004	4 - 6	--	--	--	1.75 ± 0.52	--	--	--

Am = Americium  
bgs = Below ground surface  
DRO = Diesel-range organics  
Eu = Europium  
ft = Foot  
GRO = Gasoline-range organics  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
pCi/g = Picocuries per gram  
Pu = Plutonium  
TPH = Total petroleum hydrocarbons  
U = Uranium

J = Estimated value  
-- = No detects above action levels

#### **4.4 Basis for Use Restriction Modification**

The revised FALs for radionuclides other than Eu-152 listed in [Table 4-2](#) were established based on the PALs presented in [Section 2.2.1](#). The revised FAL for Eu-152 was established based on a site-specific RESRAD calculation of a 25 mrem/yr dose under an industrial scenario (see [Section 2.2.2](#)) as prescribed in *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006c).

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel and TPH gasoline described in [Section 2.2.2](#). Hazardous constituents of TPH diesel and TPH gasoline were not detected in any of the samples at concentrations greater than their respective PALs (DOE/NV, 2001a). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs. All revised FALs other than Eu-152 were established at the PAL concentrations.

[Table 4-2](#) presents the sample results with the revised FALs and demonstrate that none exceed the revised FALs.

**Table 4-2**  
**Revised Final Action Levels for CAS 03-09-07**

Sample ID	Depth (ft bgs)	Am-241	Eu-152	U-235	Pu-238	Pu-239
		Revised FAL 12.7 pCi/g	Revised FAL 62.6 pCi/g	Revised FAL 17.6 pCi/g	Revised FAL 13 pCi/g	Revised FAL 12.7 pCi/g
MP0108	8 - 10	--	1.25 ± 0.48 (J)	--	--	--
MP0500	0 - 0.5	--	6.1 ± 1.2	--	--	--
MP0600	0 - 1	0.212 ± 0.066 (J)	1.97 ± 0.48	0.079 ± 0.036	0.193 ± 0.053	1.16 ± 0.19
MP0800	0 - 0.5	2.00 ± 0.72	--	--	--	0.43 ± 0.09
MP0900	0 - 1	0.125 ± 0.032 (J)	1.26 ± 0.45 (J)	0.072 ± 0.038	--	0.18 ± 0.05
MP1200	0 - 1	0.066 ± 0.022 (J)	--	--	--	0.37 ± 0.08
MP1400	0 - 0.5	--	2.61 ± 0.62	0.103 ± 0.041	--	0.29 ± 0.08
MP1401	1 - 3	--	2.77 ± 0.65	--	--	--
MP1499	0 - 0.5	--	2.55 ± 0.64	--	--	--
MP1601	1 - 3	--	1.72 ± 0.59 (J)	--	--	--
MP1603	3 - 5	--	1.95 ± 0.58	--	--	--
MP1708	8 - 10	--	3.95 ± 0.91	--	--	--
MP1711	11 - 13	--	2.85 ± 0.63	--	--	--
MP1907	7 - 9	0.96 ± 0.39	--	--	--	0.19 ± 0.055
MP2004	4 - 6	--	1.75 ± 0.52	--	--	--

Am = Americium  
bgs = Below ground surface  
Eu = Europium  
FAL = Final action level  
ft = Foot

J = Estimated value  
-- = No detects above original action levels

ID = Identification  
pCi/g = Picocuries per gram  
Pu = Plutonium  
U = Uranium

#### **4.5 Proposed Modification**

Remove the FFACO UR and associated fencing and/or postings from this site.

## **5.0 CAU 214, CAS 25-23-01 – Contaminated Materials, and CAS 25-23-19 – Radioactive Material Storage**

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### **5.1 CAS Descriptions**

Corrective Action Sites 25-23-01 and 25-23-19 are adjacent to each other and have similar historical backgrounds. They are located west of and adjacent to the Yucca Mountain Project - Sample Management Facility. The CASs were used for storage of radioactive equipment, hazardous waste, heavy equipment, reactor components, and drums and tanks of unspecified materials from 1982 to 1992. In 1995, the majority of materials were removed from the yards. Material remaining at the site as of 2004 included a large amount of steel equipment, one large furnace, large pieces of concrete and steel associated with the MX missile program, and several pallets of miscellaneous housekeeping debris (NNSA/NSO, 2004c). During closure activities, miscellaneous wood and metal debris – including metal framing, wooden pallets, and a dishwasher – were removed and disposed of as construction debris as a best management practice (BMP). Items deemed too large to remove were left in place (NNSA/NSO, 2006a).

### **5.2 Current Use Restriction Description**

The future use of any land affected by these URs is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. Site monitoring requirements for the UR include periodic visual inspections of UR postings and fencing. These are required annually for the first five years, followed by every five years, for a total of 30 years (NNSA/NSO, 2006a).

### **5.3 Basis for Current Use Restriction**

Samples were analyzed for TPH (DRO and GRO), total VOCs, total SVOCs, total RCRA metals, total beryllium, PCBs, isotopic U, isotopic Pu, Sr-90, total pesticides, Toxicity Characteristic Leaching Procedure (TCLP) pesticides, total herbicides, TCLP herbicides, total chromium, hexavalent chromium, and gamma spectroscopy. Except for TPH-DRO, all other COPCs in the material remaining (following remediation) were detected below their PALs, including VOCs and SVOCs. Concentrations of TPH-DRO exceeding the PAL of 100 mg/kg were detected in 39 samples (NNSA/NSO, 2004c).



Table 5-1 contains analytical results of all COCs at CASs 25-23-01 and 25-23-19 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 5-1**  
**Sample Results for COCs at CASs 25-23-01 and 25-23-19**  
**Used To Establish Current Use Restriction**  
(Page 1 of 2)

CAS	Sample Location	Sample ID	Depth (ft bgs)	TPH (DRO)
				PAL 100 mg/kg
25-23-01	D01	214D002	0 - 0.5	200 (H,Z)
	D02	214D041	0 - 0.5	220 (H,Z)
	D06	214D039	0 - 0.5	130 (H,Z)
	D07	214D009	0 - 0.5	3,500 (J)
	D10	214D013	0 - 0.5	2,800 (H,Z)
		214D077	3.5 - 4.0	200 (Z)
	D11	214D004	0 - 0.5	170 (H,Z)
	D12	214D006	0 - 0.5	300 (H,Z)
	D13	214D001	0 - 0.5	280 (H,Z)
	D14	214D012	0 - 0.5	110 (H,Z)
	D15	214D015	0 - 0.5	250 (H,Z)
	D16	214D040	0 - 0.5	290 (H,Z)
	D17	214D014	0 - 0.5	140 (H,Z)
	D19	214D003	0 - 0.5	180 (H,Z)
	D20	214D018	0 - 0.5	210 (H,Z)
	D21	214D005	0 - 0.5	140 (H,Z)
	D22	214D007	0 - 0.5	290 (H,Z)
	D23	214D010	0 - 0.5	290 (H,Z)
	D24	214D011	0 - 0.5	110 (H,Z)
	D25	214D043	0 - 0.5	190 (H,Z)
	D26	214D038	0 - 0.5	230 (H,Z)
	Y01	214Y001	0 - 0.5	460 (J)
		214Y002	0 - 0.5	520 (J)
	Y03	214Y005	0 - 0.5	110 (H,M)
	Y04	214Y009	0 - 0.5	240 (H,M)
		214Y010	0 - 0.5	240 (H,M)
	Y27	214Y034	0 - 0.5	140 (H,M)

**Table 5-1**  
**Sample Results for COCs at CASs 25-23-01 and 25-23-19**  
**Used To Establish Current Use Restriction**  
(Page 2 of 2)

CAS	Sample Location	Sample ID	Depth (ft bgs)	TPH (DRO)
				PAL 100 mg/kg
25-23-01		214Y064	4.5	580 (H,M)
	Y29	214Y042	0 - 0.5	120 (H,M)
	Y31	214Y044	0 - 0.5	130 (H,M)
25-23-19	Y33	214Y046	0 - 0.5	100 (H,M)
	E01	214E010	0 - 0.5	190 (H,Z)
	E02	214E001	0 - 0.5	290 (H,Z)
	E03	214E003	0 - 0.5	150 (H,Z)
	E04	214E005	0 - 0.5	140 (H,Z)
	E08	214E002	0 - 0.5	270 (H,Z)
	E09	214E006	0 - 0.5	120 (H,Z)
	E10	214E004	0 - 0.5	140 (H)
	E12	214E011	0 - 0.5	180 (H,Z)

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

H = The fuel pattern was in the heavier end of the retention time window for the analyte of interest.

J = Estimated value.

M = A pattern resembling motor fuel was detected.

Z = A significant fraction of the reported result did not resemble the patterns of the following petroleum hydrocarbon products: gasoline, JP-4, JP-8, diesel, mineral spirits, motor oil, Stoddard Solvent, and Bunker C.

#### **5.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2004c). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **5.5 Proposed Modification**

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from these sites.

## **6.0 CAU 262, CAS 25-05-06 – Leachfield**

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### **6.1 CAS Description**

The Engine Maintenance, Assembly, and Disassembly (E-MAD) Facility Posted Leachfield System (CAS 25-05-06) received radioactive and process effluent from Building 3900 (E-MAD Building). The CAS consists of the leachfield, distribution box, and associated piping. The leachfield is located approximately 625 ft southwest of Building 3900. Waste liquids generated by decontamination and chemical analysis of test units, and decontamination of personnel, equipment, and the facility were received by dedicated radioactive wastewater drains. The E-MAD Building, adjoining trailers, and the Train Decontamination Area pad components of the E-MAD Facility were connected to the posted leachfield through pipes or waste holdup tanks in a vault on the east side of the E-MAD Building (NNSA/NV, 2001a).

### **6.2 Current Use Restriction Description**

The future use of any land related to this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is defined by the 2.1-meter (m) (7-ft)-high security fence bounding the leachfield. An inspection will be performed annually and consist of visual observations to verify that the fence is in good condition, proper signs are in place and readable, and the UR is maintained (NNSA/NSO, 2003a).

### **6.3 Basis for Current Use Restriction**

Samples from this CAS were analyzed for PCBs, total VOCs, total SVOCs, TPH Diesel/Oil, total RCRA metals, isotopic Pu, isotopic U, gamma spectroscopy, and Sr-90. Ten of 97 subsurface soil samples were contaminated with Sr-90 at concentrations exceeding the PAL. Of those 10 samples, two had cesium (Cs)-137 and U contamination exceeding PALs. The PALs for the radionuclides were established in the CAIP as any activity distinguishable from undisturbed background activity. No VOC, TPH, SVOC, or PCB analytical results exceeded PALs. All RCRA metals analytical results were below PALs, except arsenic, which was detected above the PAL of 2.7 mg/kg in 59 of the 94 samples. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR (NNSA/NV, 2001a).

Table 6-1 contains analytical results of all COCs at CAS 25-05-06 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 6-1**  
**Sample Results for COCs at CAS 25-05-06**  
**Used To Establish Current Use Restriction**

Sample ID	Depth (ft bgs)	Cs-137	U-234	U-235	Sr-90
		PAL 7 pCi/g	PAL 1.56 pCi/g	PAL 0.07 pCi/g	PAL 1.17 pCi/g
EPR02B06	6.5 - 7.5	--	--	--	1.77 ± 0.40
EPR03B13	13.5 - 14.5	--	--	0.08 ± 0.030	--
EPR04A06	6 - 7	44.5 ± 5.7	8.5 ± 1.1	0.42 ± 0.081	12.6 ± 2.3
EPR04A08	8.5 - 9.5	--	1.69 ± 0.24	0.108 ± 0.034	--
EPR05A14	14 - 15	--	--	0.08 ± 0.03	--
EPR05A24	24 - 25	--	--	0.093 ± 0.035	--
EPR11A10	10 - 11	--	--	0.085 ± 0.031	--
EPR12A07	7.5 - 8.5	--	--	0.102 ± 0.035	--
EPR12A10	10 - 11	--	--	0.109 ± 0.039	3.42 ± 0.69
EPR13A08	8 - 9	--	2.03 ± 0.30	0.112 ± 0.036	8.9 ± 1.6
EPR13A10	10.5 - 11.5	--	--	0.083 ± 0.030	3.62 ± 0.72
EPR13A20	20.5 - 21.5	--	--	0.104 ± 0.034	--
EPR13A99	10.5 - 11.5	--	--	0.101 ± 0.033	3.09 ± 0.62
EPR14A07	7.5 - 8.5	--	1.61 ± 0.30	0.115 ± 0.052 (J)	3.70 ± 0.71
EPR15A07	7.5 - 8.5	--	--	0.084 ± 0.039 (J)	--
EPR16A07	7.5 - 8.5	--	--	0.09 ± 0.039 (J)	2.63 ± 0.53
EPR17A07	7.5 - 8.5	11.9 ± 1.5	--	--	4.82 ± 0.92
EPR17A10	10 - 11	--	--	0.129 ± 0.047	3.03 ± 0.61
EPR18A07	7 - 8	--	--	0.091 ± 0.041	--
EPR18A09	9.5 - 10.5	--	--	0.087 ± 0.037	--
EPR19A07	7 - 8	--	--	0.087 ± 0.041	--
EPR19A09	9.5 - 10.5	--	--	0.073 ± 0.036	--
EPR19A15	15 - 16	--	--	0.071 ± 0.035	--
EPR20A10	10 - 11	--	--	0.073 ± 0.040	--
EPR21A09	9.5 - 10.5	--	--	0.081 ± 0.041	--
EPR22A09	9.5 - 10.5	--	--	0.07 ± 0.035	--
EPR29A20	20 - 21	--	--	0.073 ± 0.026	--

bgs = Below ground surface  
Cs = Cesium  
ft = Foot  
ID = Identification

J = Estimated value  
-- = No detects above action levels

PAL = Preliminary action level  
pCi/g = Picocuries per gram  
Sr = Strontium  
U = Uranium

#### 6.4 Basis for Use Restriction Modification

The revised FALs for radionuclides other than Cs-137 as listed in [Table 6-2](#) were established based on PALs presented in [Section 2.2.1](#). The revised FAL for Cs-137 was established based on a site-specific RESRAD calculation of a 25 mrem/yr dose under an industrial scenario (see [Section 2.2.2](#)) as prescribed in *Industrial Sites Project Establishment of Final Action Levels* (NNSA/NSO, 2006c).

Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs. All revised FALs other than Cs-137 were established at the PAL concentrations.

[Table 6-2](#) presents the sample results that are the basis for the current UR and demonstrate that none exceed the revised FALs.

**Table 6-2**  
**Revised Final Action Levels for CAS 25-05-06**  
(Page 1 of 2)

Sample ID No.	Depth (ft bgs)	Cs-137	U-234	U-235	Sr-90
		Revised FAL 122 pCi/g	Revised FAL 143 pCi/g	Revised FAL 17.6 pCi/g	Revised FAL 838 pCi/g
EPR02B06	6.5 - 7.5	--	--	--	1.77 ± 0.40
EPR03B13	13.5 - 14.5	--	--	0.08 ± 0.030	--
EPR04A06	6 - 7	44.5 ± 5.7	8.5 ± 1.1	0.42 ± 0.081	12.6 ± 2.3
EPR04A08	8.5 - 9.5	--	1.69 ± 0.24	0.108 ± 0.034	--
EPR05A14	14 - 15	--	--	0.08 ± 0.03	--
EPR05A24	24 - 25	--	--	0.093 ± 0.035	--
EPR11A10	10 - 11	--	--	0.085 ± 0.031	--
EPR12A07	7.5 - 8.5	--	--	0.102 ± 0.035	--
EPR12A10	10 - 11	--	--	0.109 ± 0.039	3.42 ± 0.69
EPR13A08	8 - 9	--	2.03 ± 0.30	0.112 ± 0.036	8.9 ± 1.6
EPR13A10	10.5 - 11.5	--	--	0.083 ± 0.030	3.62 ± 0.72
EPR13A20	20.5 - 21.5	--	--	0.104 ± 0.034	--
EPR13A99	10.5 - 11.5	--	--	0.101 ± 0.033	3.09 ± 0.62
EPR14A07	7.5 - 8.5	--	1.61 ± 0.30	0.115 ± 0.052 (J)	3.70 ± 0.71
EPR15A07	7.5 - 8.5	--	--	0.084 ± 0.039 (J)	--
EPR16A07	7.5 - 8.5	--	--	0.09 ± 0.039 (J)	2.63 ± 0.53

**Table 6-2**  
**Revised Final Action Levels for CAS 25-05-06**  
(Page 2 of 2)

Sample ID	Depth (ft bgs)	Cs-137	U-234	U-235	Sr-90
		Revised FAL 122 pCi/g	Revised FAL 143 pCi/g	Revised FAL 17.6 pCi/g	Revised FAL 838 pCi/g
EPR17A07	7.5 - 8.5	11.9 ± 1.5	--	--	4.82 ± 0.92
EPR17A10	10 - 11	--	--	0.129 ± 0.047	3.03 ± 0.61
EPR18A07	7 - 8	--	--	0.091 ± 0.041	--
EPR18A09	9.5 - 10.5	--	--	0.087 ± 0.037	--
EPR19A07	7 - 8	--	--	0.087 ± 0.041	--
EPR19A09	9.5 - 10.5	--	--	0.073 ± 0.036	--
EPR19A15	15 - 16	--	--	0.071 ± 0.035	--
EPR20A10	10 - 11	--	--	0.073 ± 0.040	--
EPR21A09	9.5 - 10.5	--	--	0.081 ± 0.041	--
EPR22A09	9.5 - 10.5	--	--	0.07 ± 0.035	--
EPR29A20	20 - 21	--	--	0.073 ± 0.026	--

bgs = Below ground surface  
Cs = Cesium  
FAL = Final action level  
ft = Foot

pCi/g = Picocuries per gram  
Sr = Strontium  
U = Uranium

J = Estimated value  
-- = No detects above original action levels

## 6.5 Proposed Modification

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **7.0 CAU 271, CAS 27-05-02 – Leachfield**

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### **7.1 CAS Description**

The septic system is located southwest of Building 5210 and west of Building 5200. The west side of the CAS 27-05-02 leachfield is bordered by a natural wash (i.e., arroyo). The septic system received effluent from restroom facilities including toilets, urinals, sinks, and floor drains inside Buildings 5210 and 5200. In addition, Building 5210 had a full kitchen with food preparation, dish washing, and cleanup operations. Building 5200 contained a service sink and an acid dip tank located beside a sink on a “solder bench.” The septic system consisted of the influent lines from Buildings 5210 and 5200, a septic tank, a distribution structure, and a leachfield. The septic tank and distribution structure were removed as part of the corrective action. The remaining leachfield is approximately 80 ft long by 24 ft wide and consists of five 4-inch (in.), parallel orangeburg distribution lines. The lines are approximately 80 ft long and spaced 6 ft apart on center. The distribution lines are placed in 2-ft-wide trenches. A layer of approximately 18 in. of coarse gravel served as leachrock in each trench. The septic tank, manhole, and distribution box were removed (DOE/NV, 2001b).

### **7.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control as approved by the state and identified in the CAU CR or other CAU documentation unless appropriate concurrence is obtained in advance. The only remaining COCs associated with this CAS are confined to the leachfield. The UR was implemented for the leachfield to control inadvertent intrusion or exposure to the leachfield. Warning signs were installed at the four corners of the leachfield. An inspection will be performed annually and will consist of visual observations to verify that the proper signs are in place and readable, and the UR is maintained (NNSA/NSO, 2004a).

### **7.3 Basis for Current Use Restriction**

Samples from this CAS were analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), and PCBs. The PALs were not exceeded in any of the soil samples from remaining materials (following remediation) except arsenic and PCBs.

Arsenic was detected above the PAL of 2.7 mg/kg in 50 percent of the samples analyzed. Arsenic was detected at concentrations up to 4.93 mg/kg. Concentrations of arsenic are

consistent in the leachfield soil and do not appear to represent locations of elevated radioactivity or evidence of a localized spill. Although arsenic concentrations in the soil exceed the PAL of 2.7 mg/kg, these concentrations are believed to be within ambient conditions for CAS 27-05-02 and do not represent contamination. Therefore, arsenic is not considered to be a basis for this UR (NNSA/NSO, 2004d).

Elevated PCB concentrations were identified in the leachfield soil. Aroclor 1254 was detected at 7,600 micrograms per kilogram ( $\mu\text{g/kg}$ ) in one sample, exceeding the 1,000  $\mu\text{g/kg}$  PAL. Aroclor 1248 was detected in concentrations exceeding the 1,000  $\mu\text{g/kg}$  PAL, in 10 samples, at levels up to 22,000  $\mu\text{g/kg}$ . The highest concentrations were detected in surface soil samples (NNSA/NSO, 2004d).

Table 7-1 contains analytical results of all COCs at CAS 27-05-02 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 7-1**  
**Sample Results for COCs at CAS 27-05-02**  
**Used To Establish Current Use Restriction**

Sample ID	Depth (ft bgs)	Aroclor 1248	Aroclor 1254
		PAL 1,000 $\mu\text{g/kg}$	PAL 1,000 $\mu\text{g/kg}$
271Q003	5.2 - 6.2	1,000	--
271Q203	5.5 - 6	5,300	7,600 (J)
271Q208	0 - 0.5	19,000	--
271Q224	0 - 1	22,000	--
271Q225	2.5 - 3	4,700	--
271Q228	0 - 0.5	8,400	--
271Q229	2.5 - 3	9,400	--
271Q230	2.5 - 3	1,500	--
271Q231	5.5 - 6	2,800	--
271Q232	8.5 - 9	5,800	--

bgs = Below ground surface  
ft = Foot  
ID = Identification  
PAL = Preliminary action level  
 $\mu\text{g/kg}$  = Micrograms per kilogram

J = Estimated value  
-- = No detects above action levels



#### 7.4 Basis for Use Restriction Modification

The revised FALs for PCBs listed in [Table 7-2](#) were established using the Tier 2-based FAL process presented in [Section 2.2.2](#). These FALs were calculated using the Occasional Use Area site-specific exposure scenario. This scenario assumes that a worker will be exposed to the site contaminants for up to 400 total hours. This exposure scenario is for undeveloped sites, where there are no facilities, where an industrial worker would normally be assigned (NNSA/NSO, 2006c). Because CAS 27-05-02 is located in a remote area of the NTS (Area 27), no current or foreseeable future activities would cause any worker to be exposed to this site for a period of time exceeding that assumed in the Occasional Use Area site-specific scenario (i.e., 400 total hours). However, these undeveloped areas may be used for military type exercises where it is assumed that a worker could be exposed for a period of up to 80 hours per year for five years.

The UR modification would be to implement an administrative UR as described in [Section 2.0](#). This administrative UR would restrict any activity that would result in any worker being within the UR boundary for a lifetime-duration of more than 400 total hours.

[Table 7-2](#) presents the sample results that are the basis for the current UR and demonstrate that none exceed the revised FALs (based on an Occasional Use Area land-use scenario).

**Table 7-2**  
**Revised Final Action Levels for CAS 27-05-02**  
(Page 1 of 2)

Sample ID	Depth (ft bgs)	Aroclor 1248	Aroclor 1254
		Revised FAL 59,100 µg/kg	Revised FAL 49,100 µg/kg
271Q003	5.2 - 6.2	1,000	--
271Q203	5.5 - 6	5,300	7,600 (J)
271Q208	0 - 0.5	19,000	--
271Q224	0 - 1	22,000	--
271Q225	2.5 - 3	4,700	--
271Q228	0 - 0.5	8,400	--
271Q229	2.5 - 3	9,400	--
271Q230	2.5 - 3	1,500	--
271Q231	5.5 - 6	2,800	--

**Table 7-2**  
**Revised Final Action Levels for CAS 27-05-02**  
 (Page 2 of 2)

Sample ID	Depth (ft bgs)	Aroclor 1248	Aroclor 1254
		Revised FAL 59,100 µg/kg	Revised FAL 49,100 µg/kg
271Q232	8.5 - 9	5,800	--

bgs = Below ground surface  
 FAL = Final action level  
 ft = Foot

ID = Identification  
 µg/kg = Micrograms per kilogram

J = Estimated value  
 -- = No detects above original action levels

### **7.5 Proposed Modification**

Implement an administrative UR as described in [Section 2.0](#) restricting any activity that would result in any worker being within the UR boundary for a lifetime-duration of more than 400 total hours. Remove all associated fencing and postings and discontinue inspection and maintenance at this site.

## **8.0 CAU 321, CAS 22-99-05 – Fuel Storage Area**

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### **8.1 CAS Description**

Corrective Action Site 22-99-05 is the only CAS within CAU 321, located in Area 22 of the NTS. The Fuel Storage Area was used to store fuel and other petroleum products necessary for motorized operations at the historic Camp Desert Rock facility, which was operational from 1951 to 1958. The Fuel Storage Area was dismantled after 1958 (NNSA/NV, 2001b).

The Fuel Storage Area was identified as a potential oil spill site. A 1955 aerial photograph shows two rectangular tanks and other items stored within the bermed Fuel Storage Area. The site has one relatively small area where slightly discolored soil has been observed. Otherwise, there is no visible staining, odor, or vegetative stress observed within the Fuel Storage Area (NNSA/NV, 2001b).

### **8.2 Current Use Restriction Description**

The future use of any land related to this UR, as defined by the 150-square-foot (ft<sup>2</sup>) area, located in the southeast corner of CAU 321, is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. There are no monitoring requirements associated with this UR (NNSA/NV, 2001b).

### **8.3 Basis for Current Use Restriction**

Samples were analyzed for VOCs, SVOCs, TPH-gasoline, TPH-diesel, and total lead. Samples analyzed for TPH (DRO) at 11 to 12 ft below ground surface (bgs), and 16 to 17 ft bgs from sample location 32100E during the January/February 2001 investigation, had concentrations of 220 mg/kg and 170 mg/kg, respectively. These concentrations exceeded the PAL of 100 mg/kg. No VOCs or SVOCs were detected above PALs. No radiological analyses were conducted because all the field survey results were within background levels. No other contaminants were identified above PALs at the site (NNSA/NV, 2001b).

[Table 8-1](#) contains analytical results of all COCs at CAS 22-99-05 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 8-1  
Sample Results for COCs at CAS 22-99-05  
Used To Establish Current Use Restriction**

Investigation	Sample ID	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
January/February 2001	32100E11	11 - 12	220
	32100E16	16 - 17	170

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

#### **8.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NV, 2001b). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **8.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this CAS.

## **9.0 CAU 322, CAS 01-25-01 – AST Release**

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### **9.1 CAS Description**

The former aboveground storage tank (AST) is located in Area 1, within the boundaries of the Shaker Plant, in the northern portion of plant grounds. The AST was located within a berm constructed of earth and gravel, and the berm floor contains several pieces of large wooden plyboard used for tank support. Additional pieces of heavy railroad ties were discovered under the berm floor surface during excavation. The berm once contained a 10,000-gal diesel fuel AST, which was relocated approximately 40 ft southeast of the CAS. The AST provided fuel for the operation of the Shaker Plant (NNSA/NSO, 2004e).

### **9.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. As part of closure activities, fencing was erected around the rectangular AST berm to limit access to the interior of the berm, and four UR signs were posted around the perimeter of the berm. Site monitoring requirements for the UR include periodic visual inspections of UR postings and fencing. These are required annually for the first five years, followed by every five years, for a total of 30 years (NNSA/NSO, 2006b).

### **9.3 Basis for Current Use Restriction**

Samples were analyzed for TPH (DRO and GRO), total VOCs, total SVOCs, total RCRA metals, total beryllium, PCBs, and gamma spectroscopy. Except for TPH-DRO, all other COPCs were detected below their PALs, including VOCs and SVOCs. Concentrations of TPH-DRO exceeding the PAL of 100 mg/kg were detected at both sampling locations (NNSA/NSO, 2004e).

[Table 9-1](#) contains analytical results of all COCs at CAS 01-25-01 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 9-1  
Sample Results for COCs at CAS 01-25-01  
Used To Establish Current Use Restriction**

Sample Location	Sample ID	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
A01	322A001	0 - 0.5	2,900 (J)
	322A002	2 - 3	480 (D)
A02	322A003	0 - 0.5	5,900 (J)
	322A004	2 - 3	7,000 (J)
	322A005	2 - 3	6,900 (D)
	322A009	4 - 5	6,700 (D)
	322A010	6 - 7	1,100 (D)
	322A011	9 - 10	140 (D)

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

D = A pattern resembling diesel was detected in the samples.  
J = Estimated value

#### **9.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2004e). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **9.5 Proposed Modification**

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **10.0 CAU 322, CAS 03-25-03 – Mud Plant AST Diesel Release**

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### **10.1 CAS Description**

Corrective Action Site 03-25-03 is located within the former Mud Plant facility in the former Area 3 Camp. The Mud Plant facility began operation in February 1962 and was used to formulate mud mixtures in support of drilling operations for the UGTA Project. The Mud Plant facility operations ceased in December 1995. An AST containing fuel oil and a fuel dispensing station were located approximately 350 ft west of the Mud Plant. Available records indicated the AST had a capacity of approximately 10,000 gal and was located in a gravel containment pit. Aerial photos indicate the fuel dispensing station was located south of the AST. Information was not available regarding the type of equipment or physical condition of the fuel dispensing station. The AST and fuel station were removed; however, the date of the removal is not available (NNSA/NSO, 2003f).

### **10.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. As part of closure activities, fencing was erected along the Mud Plant boundary, connecting with existing fencing surrounding the Mud Plant Pond and Mud Disposal Crater to limit access to the interior of the contaminated area, and six UR signs were installed around the impacted area between the Mud Plant, Mud Plant Pond, and Mud Disposal Crater. Site monitoring requirements for the UR include periodic visual inspections of UR postings and fencing. These are required annually for the first five years, followed by every five years, for a total of 30 years. (NNSA/NSO, 2006b)

### **10.3 Basis for Current Use Restriction**

Samples were analyzed for TPH (DRO and GRO), total VOCs, total SVOCs, total RCRA metals, PCBs, total beryllium, isotopic U, isotopic Pu, Sr-90, and gamma spectroscopy. Except for TPH-DRO, all other COPCs were detected below their PALs, including VOCs and SVOCs. Concentrations of TPH-DRO exceeding the PAL of 100 mg/kg were detected at six sampling locations (NNSA/NSO, 2004e).

Table 10-1 contains analytical results of all COCs at CAS 03-25-03 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 10-1**  
**Sample Results for COCs at CAS 03-25-03**  
**Used To Establish Current Use Restriction**

Sample Location	Area	Sample ID	Depth (ft bgs)	TPH (DRO)
				PAL 100 mg/kg
B01	A	322B038	2 - 3	140 (D,H,M)
B04		322B010	0 - 0.5	370 (H,M)
B08	B	322B053	2 - 3	170 (H,M)
B14		322B043	14 - 15	300 (H,Y)
B15		322B020	0 - 0.5	150 (H,M)
		322B044	2 - 3	4,000 (Y)
B17		322B062	2 - 3	1,500 (H,M)

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

D = A pattern resembling diesel was detected in the samples.  
H = The fuel pattern was in the heavier end of the retention time window for the analyte of interest.  
M = A pattern resembling motor oil was detected.  
Y = Multippeak chromatogram does not match target analytes.

#### **10.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2004e). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **10.5 Proposed Modification**

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.



## **11.0 CAU 335, CAS 06-20-02 – 20-inch Cased Hole**

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### **11.1 CAS Description**

The Cased Hole is approximately 10 ft from the northeast corner of Building 6-388 in the southern portion of the Well 3 Yard. The site was used for the disposal of used motor oil, wastewater, and debris. On October 2, 1990, the Cased Hole was inspected by Reynolds Electrical & Engineering Co., Inc., and noted to be a 20-in. diameter steel casing that rises approximately 2 ft above grade. Used motor oil, wastewater, and solid debris were removed from the casing (DOE/NV, 2000c).

The casing was excavated with a backhoe on July 25, 1991. During excavation, the surface soil surrounding the casing was noted to be contaminated. The Cased Hole was then backfilled, though it is unknown when this occurred or what material was used for backfill. The site is currently described as a 5-ft-diameter, 3-in.-high mound of soil, presumably at the former location of the Cased Hole (DOE/NV, 2000c).

### **11.2 Current Use Restriction Description**

The future use of any land related to this CAS is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR covers two land areas: (1) a large area south of Road 6-06, and (2) a small area immediately north of Road 6-06. T-posts with attached warning signs were placed along the perimeter of the areas approximately every 100 ft. All signs warn of the presence of TPH-contaminated soil and lists contact information. Post-closure monitoring consists of an annual sign inspection to verify that they are in place and readable, and that URs are maintained (NNSA/NSO, 2003b).

### **11.3 Basis for Current Use Restriction**

Samples were analyzed for total VOCs, total SVOCs, TPH (DRO), and total RCRA metals. Except for arsenic, TPH (DRO) was the only COPC detected above PALs in the remaining material (following remediation). Arsenic was detected above the PAL of 2.7 mg/kg in all 12 samples taken at Cased Hole. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. Total petroleum hydrocarbons (DRO) were

detected at concentrations exceeding the PAL of 100 mg/kg in 16 of 93 soil samples collected at this CAS. The vertical extent of TPH (DRO) contamination did not exceed 0.5 ft bgs except for three anomalous sample locations at the Cased Hole where TPH was found at up to 5 ft bgs. The lateral extent of TPH (DRO) contamination at the Cased Hole was generally confined to the north by Road 6-06, to the east by the Mercury Highway, and to the west by the boundaries of the drilling supply storage area. No VOCs or SVOCs were detected above PALs (NNSA/NV, 2001c).

Table 11-1 contains analytical results of all COCs at CAS 06-20-02 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 11-1**  
**Sample Results for COCs at CAS 06-20-02**  
**Used To Establish Current Use Restriction**

Investigation	Sample Location	Sample ID	Depth (ft bgs)	TPH (DRO)
				PAL 100 mg/kg
January 2001	Boring CH01 (former location of steel casing)	CH0101	0.0 - 0.5	1,100
	Boring CH02	CH0202	3 - 5	180 (J)
	Boring CH03	CH0301	0.0 - 0.5	840 (J)
May 2001	Auger CHN01	CHN01A	0.0 - 0.5	450
		CHN01X	0.0 - 0.5	480
	Auger CHN02	CHN02A	0.0 - 0.5	170
	Auger CHS02	CHS02A	0.0 - 0.5	490
	Auger CHE01	CHE01A	0.0 - 0.5	580
	Auger CHE04	CHE04A	0.0 - 0.5	140
	Auger CHW02	CHW02A	0.0 - 0.5	1,700
		CHW02B	0.5 - 2	120
	Auger CHW03	CHW03A	0.0 - 0.5	110 (J)
		CHW03X	0.0 - 0.5	110
	Auger CHW04	CHW04A	0.0 - 0.5	3,100 (J)
		CHW04C	2 - 3	690
		CHW04D	3 - 4	250

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

J = Estimated value

#### **11.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NV, 2001c). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **11.5 Proposed Modification**

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **12.0 CAU 335, CAS 06-23-03 – Drain Pit**

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### **12.1 CAS Description**

The Drain Pit is located in the northern section of the Well 3 Yard, approximately 165 ft north of Road 6-06. It was used to receive effluent from truck washing facilities in the Well 3 Yard. The Drain Pit was operational from 1963 through about 1991, a time span roughly concurrent with underground device testing at the NTS. Cement trucks and geophysical logging trucks were washed in the Well 3 Yard, using two portable steam cleaners. The Drain Pit is oblong-shaped and measures 37 by 65 ft with a maximum depth of about 6 ft at its southeast end. Three drain pipes extend from the north wall of the pit: a pair of 2.5-in.-diameter steel pipes, and a single 5-in.-diameter plastic pipe (DOE/NV, 2000c).

### **12.2 Current Use Restriction Description**

The future use of any land related to this CAS is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. T-posts with attached warning signs were placed every 100 ft along the perimeter of the area identified in the NDEP-approved CADD (NNSA/NV, 2001c). All signs warn of the presence of TPH contaminated soil, list contact information, and face out away from the restricted area. Warning signs were placed at the four corners and at the midpoint of each side of the area. Post-closure monitoring consists of annual visual inspection of the signs to verify that they are in place and readable, and that URs are maintained (NNSA/NSO, 2003b).

### **12.3 Basis for Current Use Restriction**

Samples were analyzed for total VOCs, total SVOCs, TPH (DRO), total RCRA metals, TPH (GRO), ethylene glycol monobutyl ether, PCBs, isotopic U, isotopic Pu, and Sr-90. Total petroleum hydrocarbons (DRO) and arsenic were the only COPCs detected above PALs. Arsenic was detected above the PAL of 2.7 mg/kg in 27 of 27 samples. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. Total petroleum hydrocarbons (DRO) were detected at concentrations exceeding the PAL of 100 mg/kg in 16 of 50 soil samples collected from the Drain Pit. The vertical extent of TPH (DRO) contamination did not exceed 2 ft bgs. The lateral extent of TPH (DRO) contamination at the Drain Pit investigation area was generally confined to the east by the Birdwell Building, to

the west by a large concrete pad, and to the south by Road 6-06. Contamination was not found north of the Drain Pit. No VOCs or SVOCs were detected above PALs (NNSA/NV, 2001c).

Table 12-1 contains analytical results of all COCs at CAS 06-23-03 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 12-1**  
**Sample Results for COCs at CAS 06-23-03**  
**Used To Establish Current Use Restriction**

Investigation	Sample Location	Sample ID	Depth (ft bgs)	TPH (DRO)
				PAL 100 mg/kg
January 2001	Boring DP02 (Outside Drain Pit)	DP0202	0.5 - 2	660
	Boring DP03 (Outside Drain Pit)	DP0302	0.5 - 2	360
	Boring DP04 (Outside Drain Pit)	DP0402	0.5 - 2	120
	Boring DP05 (Outside Drain Pit)	DP0502	0.5 - 2	230
	Boring DP06 (Outside Drain Pit)	DP0602	0.5 - 2	180
	Boring DP07 (Inside Drain Pit)	DP0701	0.0 - 0.5	650
		DP0702	0.5 - 2	450
	Boring DP08 (Inside Drain Pit)	DP0801	0.0 - 0.5	670
		DP0802	0.5 - 2	380
May 2001	Boring DP09 (Inside Drain Pit)	DP0901	0.0 - 0.5	430
		DP0902	0.5 - 2	580
	Auger DPS01	DPS01A	0.0 - 0.5	130
	Auger DPS04	DPS04A	0.0 - 0.5	150
	Auger DPE01	DPE01A	0.0 - 0.5	150
	Auger DPE03	DPE03A	0.0 - 0.5	120
	Auger DPW02	DPW02A	0.75 - 1	470

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

#### ***12.4 Basis for Use Restriction Modification***

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NV, 2001c). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### ***12.5 Proposed Modification***

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **13.0 CAU 342, CAS 23-56-01 – Former Mercury Fire Training Pit**

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### **13.1 CAS Description**

The Former Mercury Fire Training Pit (FTP) is located in Area 23 of the NTS on the west side of the Mercury Bypass Road and was used between approximately 1965 and 1990 to train firefighting personnel. It encompasses an area approximately 85 by 115 m (280 by 380 ft). The FTP formerly included a bermed burn pit with four small burn tanks; four large aboveground storage tanks (ASTs); an overturned bus; a telephone pole storage area; and areas for burning sheds, pallets, and cables. Training events involved burning fuels including off-specification or rust-contaminated gasoline; diesel; aviation fuel (JP-4); and other materials such as paint, tires, a pond liner, wood, paper, cloth, and copper cable (DOE/NV, 2000a).

### **13.2 Current Use Restriction Description**

The future use of any land related to this CAS is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. A perimeter fence with warning signs encompasses the former Mercury FTP area (approximately 85 by 115 m [280 by 380 ft]). The defined plume is limited vertically to 50 ft. Site monitoring requirements include biannual visual inspection (DOE/NV, 2000a).

The CR states that the Post-Closure Plan also includes monitoring of soil gas vapor, to be performed initially within six months of completing field activities to establish baseline concentrations, and then every two years to determine whether natural attenuation is degrading the remaining petroleum hydrocarbons (DOE/NV, 2000a). Soil gas samples were collected on November 29, 2005, for VOC and SVOC analysis. Samples were collected on December 1, 2005, for analysis of base gases. The effectiveness of natural attenuation was evaluated and noted to be occurring. It was recommended that monitoring be discontinued (NNSA/NSO, 2006d) and on August 28, 2006, NDEP acknowledged and approved the decision to discontinue soil monitoring (Elle, 2006).

### **13.3 Basis for Current Use Restriction**

Samples were analyzed for total and leachable VOCs, total SVOCs, total and leachable RCRA metals and zinc, TPH, PCBs, and gamma spectroscopy. Samples collected from locations where physical evidence or site history indicated burning (e.g., cable racks, charcoal stains, and burn

sheds) were analyzed for dioxins and furans. Petroleum hydrocarbons, xylene, and arsenic were the only COPCs detected above PALs. Petroleum hydrocarbons (diesel, gasoline, waste oil, and unknown hydrocarbons) were detected above the PAL of 100 mg/kg in 37 samples. Of these, 33 were taken from the AST area and the CAS 23-56-01 burn pit. The VOC xylene was detected above the PAL of 320 mg/kg in one sample from the area of highest TPH contamination in the AST subsurface plume. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR (DOE/NV, 1999c).

Table 13-1 contains analytical results of all COCs at CAS 23-56-01 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 13-1**  
**Sample Results for COCs at CAS 23-56-01**  
**Used To Establish Current Use Restriction**  
(Page 1 of 2)

Sample ID	Depth (ft bgs)	Xylene	Diesel	Waste Oil	Gasoline	Unknown Hydrocarbon
		PAL 320 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg
FTP00020	0 - 1	--	--	--	--	440
FTP00021	3 - 4	--	--	--	--	420
FTP00022	0 - 1	--	--	--	--	130
FTP00025	3 - 4	--	--	--	--	100
FTP00026	0 - 1	--	--	--	--	230
FTP00027	3 - 4	--	--	--	--	420
FTP00028	0 - 1	--	--	--	--	180
FTP00029	3 - 4	--	--	--	--	370
FTP00034	0 - 1	--	--	--	--	210
FTP00035	3 - 4	--	--	--	--	590
FTP00036	0 - 1	--	--	--	--	760
FTP00048	0 - 1	--	250	--	--	--
FTP00049	3 - 4	--	--	--	--	3,000
FTP00055	0 - 1	--	--	--	--	4,000
FTP00056	3 - 4	--	2,800	--	--	--
FTP00057	0 - 1	--	--	--	--	410



**Table 13-1**  
**Sample Results for COCs at CAS 23-56-01**  
**Used To Establish Current Use Restriction**  
(Page 2 of 2)

Sample ID	Depth (ft bgs)	Xylene	Diesel	Waste Oil	Gasoline	Unknown Hydrocarbon
		PAL 320 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg
FTP00058	3 - 4	--	2,500	--	--	--
FTP00062	0 - 1	--	--	1,400	--	--
FTP00086	0 - 1	--	--	--	--	4,000
FTP00089	0 - 1	--	4,100 (J)	--	--	--
FTP00091	4 - 5	--	3,400 (J)	--	--	--
FTP00094	19 - 20	--	10,000 (J)	--	--	--
FTP00108	14 - 15	--	--	230	--	--
FTP00109	19 - 20	--	140	--	--	--
FTP00111	4 - 5	--	--	--	--	3,300
FTP00112	9 - 10	--	--	--	--	10,000
FTP00128	9 - 10	--	16,000 (J)	--	530	--
FTP00133	9 - 10	--	13,000 (J)	--	--	--
FTP00136	14 - 15	--	7,600 (J)	--	--	--
FTP00145	19 - 20	--	3,000 (J)	--	--	--
FTP00149	19 - 20	--	7,500 (J)	--	--	--
FTP00154	24 - 25	480 (J)	18,000 (J)	--	3,000 (J)	--
FTP00160	18.5 - 19	--	5,400 (J)	--	320 (J)	--

bgs = Below ground surface

ft = Foot

ID = Identification

mg/kg = Milligrams per kilogram

PAL = Preliminary action level

J = Estimated value

-- = No detects above action levels

### **13.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the hazardous constituents of TPH as described in [Section 2.2.2](#). The only TPH-related contaminant detected above the corresponding PAL (DOE/NV, 1999c) was xylene. This constituent was evaluated per the Tier 2 evaluation process as described in [Section 2.2.2](#). Under a Tier 2 evaluation, comparisons to action levels are only conducted at reasonable points of exposure. The single sample with a concentration exceeding the PAL was collected from a depth of 24 to 25 ft bgs. As this depth is not a reasonable point of exposure, it was not evaluated. No other

instances of xylene contamination exist at the CAS at concentrations that exceed the PAL. Therefore, no contaminants are considered to be present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

### ***13.5 Proposed Modification***

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **14.0 CAU 355, Area 2 Cellars/Mud Pits**

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### **14.1 CAS Descriptions**

Corrective Action Unit 355 is comprised of the following 15 CASs located in Area 2 of the NTS:

- CAS 02-37-01, Cellar & Mud Pit
- CAS 02-37-03, Cellar & Mud Pit
- CAS 02-37-04, Cellar & Mud Pit
- CAS 02-37-05, Cellar & Mud Pit
- CAS 02-37-06, Cellar & Mud Pit
- CAS 02-37-07, Cellar & Mud Pit
- CAS 02-37-10, Cellar & Mud Pit
- CAS 02-37-11, Cellar & Mud Pit
- CAS 02-37-12, Cellar & Mud Pit
- CAS 02-37-13, Cellar & Mud Pit
- CAS 02-37-14, Cellar & Mud Pit
- CAS 02-37-15, Cellar & Mud Pit
- CAS 02-37-16, Cellar & Mud Pit
- CAS 02-37-17, Cellar
- CAS 02-37-18, Cellar & Tanks

Historical documentation and interviews indicate that the cellars and associated mud pits in CAU 355 were constructed to support post-test drillback activities at sites where underground nuclear testing was conducted from 1967 through 1990. Post-test boreholes were drilled to re-enter the test cavities to determine cavity and chimney size, to observe the effects of the test on the surrounding material, determine the distribution of radioactivity in the area, and collect samples for analysis. During the drilling process, drilling mud was used for cooling and lubrication, and to carry the drill cuttings to the surface where they were deposited in a nearby mud pit (NNSA/NSO, 2003g).

Corrective Action Site 02-37-01 consists of a backfilled cellar within fencing that measures 13 by 13 ft and an open mud pit that measures 16 by 59 ft in total area. The mud pit is fenced and posted as an Underground Radioactive Material Area (URMA). The borehole casing has been plugged with cement and the cellar backfilled with soil/gravel (NNSA/NSO, 2003g).

Corrective Action Site 02-37-03 consists of a backfilled cellar and a backfilled mud pit inside a fence. The fence measures 26 by 128 ft and is posted as an URMA. The borehole casing has been plugged with cement and the cellar backfilled with soil/gravel (NNSA/NSO, 2003g).

Corrective Action Site 02-37-04 consists of a backfilled cellar and backfilled mud pit located inside a fence that is posted as an URMA. The total fenced area measures 20 by 128 ft. The borehole casing has been plugged with cement and the cellar backfilled with soil/gravel (NNSA/NSO, 2003g).

Corrective Action Site 02-37-05 consists of a backfilled cellar inside a fence that is posted as an URMA and measures 16 by 59 ft. The open mud pit measures 141 by 151 ft and contains gray drilling mud residue and large amounts of drill cuttings. The borehole casing has been plugged with cement and the cellar backfilled with soil/gravel (NNSA/NSO, 2003g).

Corrective Action Site 02-37-06 consists of a cellar that has been backfilled and is located inside a fence. The open mud pit measures 50 by 75 ft and is inside a fence that is posted as an URMA. The borehole casing was plugged with cement and the cellar backfilled with soil/gravel in 1994 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-07 consists of a backfilled cellar and open mud pit located inside a fence that is posted as an URMA. The mud pit measures 27 by 66 ft. The borehole casing was plugged with cement and the cellar backfilled with soil/gravel in 1981 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-10 consists of a backfilled cellar and backfilled mud pit inside a fence that measures approximately 26 by 151 ft and is posted as an URMA. The borehole casing was plugged with cement and the cellar backfilled with soil/gravel in 1970 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-11 consists of a backfilled cellar and backfilled mud pit inside a fence. The fence measures 36 by 141 ft and is posted as an URMA. The borehole casing was plugged with cement and the cellar backfilled with soil/gravel in 1971 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-12 consists of a backfilled cellar and backfilled mud pit located inside a fence. The fence measures 67 by 118 ft and is posted as an URMA. The borehole casing was plugged with cement and the cellar backfilled soil/gravel in 1973 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-13 consists of a backfilled cellar and backfilled mud pit located inside a fence. The fence measures 67 by 118 ft and is posted as an URMA (NNSA/NSO, 2003g).

Corrective Action Site 02-37-14 consists of a backfilled cellar and an open mud pit located inside a fence measuring approximately 60 by 90 ft and is posted as an URMA. The borehole casing was plugged with cement and the cellar was backfilled with soil/gravel in 1972 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-15 consists of a backfilled cellar and backfilled mud pit located in a fence measuring 50 by 157 ft and is posted as an URMA. The borehole casing was plugged with cement and the cellar backfilled with soil/gravel in 1972 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-16 consists of a backfilled cellar and backfilled mud pit located inside a fence measuring 20 by 85 ft, and is posted as an URMA. The post-test borehole was plugged with cement and the cellar backfilled with soil/gravel in 1976 (NNSA/NSO, 2003g).

Corrective Action Site 02-37-17 consists of an open cellar measuring 8 ft in diameter and is approximately 10 ft deep. The cellar contains dark, moist soil and organic material; suspected drilling mud, and is located inside a fence that is posted as an URMA. It is a post-test cellar that is currently open (i.e., not backfilled). This cellar is associated with a post-test borehole that is identified to be plugged and abandoned by the Borehole Management Program (NNSA/NSO, 2003g).

Corrective Action Site 02-37-18 consists of an open cellar measuring 8 ft in diameter and 14 ft deep and an associated open mud pit not mentioned in the FFACO CAS description. The tanks mentioned in the CAS description have been removed from the site. The cellar is located inside a fence that is posted as an URMA, and contains dark, moist soil and organic material, and suspected drilling mud. The mud pit measures 59 by 125 ft, with one side of the pit partially backfilled, and contains wood and plastic piping debris. The cellar was completed as a gas sampling hole in 1990. It is a post-test cellar that is currently open (i.e., not backfilled). This cellar is associated with a post-test borehole that is identified to be plugged and abandoned by the Borehole Management Program (NNSA/NSO, 2003g).

### **14.2 Current Use Restriction Description**

The future use of any land affected by all URs in this CAU is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance (NNSA/NSO, 2003c).

The UR boundary points for CASs 02-37-01, 02-37-14, and 02-37-16 are at the corners of the fences posted for demarcation of the URMA. There are no site monitoring requirements (NNSA/NSO, 2003c).

The UR boundary points for CASs 02-37-03, 02-37-04, 02-37-05, 02-37-06, 02-37-07, 02-37-10, 02-37-11, 02-37-12, 02-37-17, and 02-37-18 are the cellar concrete pad corners. There are no site monitoring requirements (NNSA/NSO, 2003c).

The UR boundary points for CASs 02-37-13 and 02-37-15 are the cellar facility demarcation fence corners. There are no site monitoring requirements (NNSA/NSO, 2003c).

### **14.3 Basis for Current Use Restriction**

All of the 15 CASs included a post-test drillback cellar. Thirteen of the post-test cellars were previously backfilled with clean fill material. Two of the post-test cellars at CASs 02-37-17 and 02-37-18 were open (i.e., not backfilled). In addition, 14 of the CASs included an associated drilling mud pit, with eight of these mud pits previously backfilled with clean fill, and the remaining six left open (i.e., not backfilled) (NNSA/NSO, 2003c).

Characterization samples were collected from the base of the two open cellars, the approximate base of the 13 backfilled cellars, and from drilling mud in the 14 mud pits. Samples were analyzed for VOCs, SVOCs, RCRA metals, TPH (full scan), PCBs, and gamma spectroscopy. Petroleum hydrocarbons (diesel, oil, and TPH) were detected above the PAL of 100 mg/kg for samples collected from the two open cellars (CASs 02-37-17 and 02-37-18), three backfilled cellars (CASs 02-37-11, 02-37-15, and 02-37-16), and from three of the mud pits (CASs 02-37-01, 02-37-14, and 02-37-16). Total petroleum hydrocarbons were the only COC detected at concentrations above action levels in any of the characterization samples collected, no VOCs or SVOCs were detected above PALs (NNSA/NSO, 2003c).

Based on the characterization sample results for the open post-test cellars and process knowledge of the historical decontamination of drilling equipment over the post-test cellars, it is reasonable

to assume that TPH is present at the base of the backfilled post-test cellars at concentrations exceeding the action level. For this reason, URs were implemented at all 15 post-test cellars in CAU 355 (NNSA/NSO, 2003c).

Table 14-1 contains analytical results of all COCs at CAU 355 that are the basis for the current URs. The sample matrix for all samples is soil.

**Table 14-1**  
**Sample Results for COCs at CAU 355**  
**Used To Establish Current Use Restriction**

Sample ID	Diesel	Oil	TPH
	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg
01-01-M0 Dup. of 01-01-M1	120	1,200	1,320
01-01-M1	120	920	1,040
11-(0-12)-C1	--	160	160
14-0-M2	--	110	110
15-(0-7)-C1	--	140	140
16-7-M1	--	1,200	1,200
16-6-C1	390	140	530
17-10-C1	260	1,600	1,860
18-14-C1	350	7,500	7,850

ID = Identification  
mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons  
-- = No detects above action levels

#### **14.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of the hazardous constituents of TPH as described in [Section 2.2.2](#). Because the URs were implemented at all 15 post-test cellars in CAU 355, based on the characterization sample results for the open post-test cellars, and the fact that the samples with the maximum concentrations of TPH have no TPH-related contaminant concentrations above their corresponding PALs, it is reasonable to assume that no contaminants are present at this site in concentrations exceeding PALs, and the revised FALs were established at the PAL concentrations (NNSA/NSO, 2003c).

#### **14.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this site.

## ***15.0 CAU 356, CAS 03-04-01 – Area 3 Change House Septic System***

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### ***15.1 CAS Description***

The Area 3 Change House Septic System consists of a dual-chambered, steel septic tank; a concrete manhole south of the septic tank; two leachfields (referred to as the “previous leachfield” and the “fenced leachfield”); a concrete skimmer box at the proximal end of the fenced leachfield; and associated piping both upstream and downstream of the septic tank. The system was initially constructed in the 1960s and received effluent from at least nine Area 3 Camp buildings and trailers until its abandonment in 1991. In 1989, an unpermitted lagoon formed above the fenced leachfield as a consequence of excessive flow and saturated conditions. A new septic system was proposed, but not implemented due to the impending relocation of the Area 3 Camp to Area 6. Temporary remediation of the existing system consisted of evacuating the septic tank of fluids to be treated at other NTS facilities until the camp was abandoned. The temporary remediation efforts resulted in no additional percolation of effluent above ground surface (NNSA/NV, 2002a).

### ***15.2 Current Use Restriction Description***

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. Orange snow fencing was installed around the 100-by-75-ft perimeter of the fenced leachfield. Use restriction signs were posted on permanent posts/poles on each side of the fenced leachfield. There is no annual monitoring or inspection requirements associated with the UR (NNSA/NV, 2002a).

### ***15.3 Basis for Current Use Restriction***

Twenty-three soil samples were collected and analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), isotopic Pu, isotopic U, isotopic Am, and gamma spectrometry. One analytical result indicated the presence of TPH (DRO) (400 mg/kg) contamination exceeding the NDEP action level of 100 mg/kg at one location. No VOCs or SVOCs were detected above PALs. Arsenic was detected above the PAL of 2.7 mg/kg in all samples analyzed, but all concentrations were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. The radionuclides Am-241, Pu-238, and Pu-239/240 exceeded their respective PALs. The PALs for the radionuclides were



established in the CAIP as any activity distinguishable from undisturbed background activity (NNSA/NV, 2002a).

Table 15-1 contains analytical results of all COCs that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 15-1**  
**Sample Results for COCs at CAS 03-04-01**  
**Used To Establish Current Use Restriction**

Sample ID	Depth (ft bgs)	Pu-238	Pu-239/240	Am-241	TPH (DRO)
		PAL 0.05 pCi/g	PAL 0.106 pCi/g	PAL 0.05 pCi/g	PAL 100 mg/kg
356003	5.0 - 5.5	--	0.485 ± 0.14 (J)	0.639 ± 0.20	--
356005	5.25 - 5.75	--	--	2.44 ± 0.38	--
356012	0.0 - 0.5	--	--	--	400 (J)
356013	0.0 - 0.5	--	--	1.76 ± 0.41 (J)	--
356016	4.0 - 4.5	--	--	4.08 ± 0.53 (J)	--
356095	5.0 - 5.5	--	0.435 ± 0.12 (J)	3.64 ± 1.8	--
356204	0.0 - 0.5	0.049 ± 0.026	0.211 ± 0.058	--	--
356205	0.0 - 0.5	--	0.226 ± 0.058	0.053 ± 0.027	--
356207	0.0 - 0.5	0.117 ± 0.042	1.38 ± 0.23	0.173 ± 0.052	--
356209	0.0 - 0.5	0.469 ± 0.094	16.5 ± 2.3	2.23 ± 0.34	--

Am = Americium  
bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
mg/kg = Milligrams per kilogram

ID = Identification  
PAL = Preliminary action level  
pCi/g = Picocuries per gram  
Pu = Plutonium  
TPH = Total petroleum hydrocarbons

J = Estimated value  
-- = No detects above action levels

#### **15.4 Basis for Use Restriction Modification**

The revised FALs for radionuclides listed in Table 12-2 were established based on the PALs presented in [Section 2.2.1](#).

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NV, 2002a).

Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

Table 15-2 presents the sample results that are the basis for the current UR was based and demonstrate that none exceed the revised FALs.

**Table 15-2**  
**Revised Final Action Levels for CAS 03-04-01**

Sample ID	Depth (ft bgs)	Pu-238	Pu-239/240	Am-241
		Revised FAL 13 pCi/g	Revised FAL 12.7 pCi/g	Revised FAL 12.7 pCi/g
356003	5.0 - 5.5	--	0.485 ± 0.14 (J)	0.639 ± 0.20
356005	5.25 - 5.75	--	--	2.44 ± 0.38
356013	0.0 - 0.5	--	--	1.76 ± 0.41 (J)
356016	4.0 - 4.5	--	--	4.08 ± 0.53 (J)
356095	5.0 - 5.5	--	0.435 ± 0.12 (J)	3.64 ± 1.8
356204	0.0 - 0.5	0.049 ± 0.026	0.211 ± 0.058	--
356205	0.0 - 0.5	--	0.226 ± 0.058	0.053 ± 0.027
356207	0.0 - 0.5	0.117 ± 0.042	1.38 ± 0.23	0.173 ± 0.052
356209	0.0 - 0.5	0.469 ± 0.094	16.5 ± 2.3	2.23 ± 0.34

Am = Americium  
bgs = Below ground surface  
FAL = Final action level  
ft = Foot

ID = Identification  
pCi/g = Picocuries per gram  
Pu = Plutonium

J = Estimated value  
-- = No detects above original action levels

### 15.5 Proposed Modification

Remove the FFACO UR and associated fencing and postings.

## **16.0 CAU 356, CAS 03-09-04 – Mud Pit**

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### **16.1 CAS Description**

Corrective Action Site 03-09-04 consists of one mud pit that received drill cuttings, drilling fluid, and/or circulated drilling materials during pre-test drilling activities. The mud pit is located west of the potential crater area for U3gi in Area 3 at the NTS. The mud pit is bermed, and tumbleweeds obscure the pit surface. The mud pit is associated with the pre-test drilling activities of either the Tulosso weapons test emplacement hole or the exploratory hole, which were drilled in 1971 and 1972 before the test. Soil originally excavated during construction of the mud pit forms a dirt mound on the southwest margin of the mud pit (NNSA/NV, 2001d).

### **16.2 Current Use Restriction Description**

The future use of any land affected by all URs in this CAU is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is defined as the perimeter of the mud pit (approximately 35 by 105 ft). Three-strand wire fencing approximately 4 ft high was emplaced around the perimeter. Use restriction signs were attached to the top strand of the wire fence on each side of the mud pit. There are no monitoring or inspection requirements associated with this UR (NNSA/NV, 2002a).

### **16.3 Basis for Current Use Restriction**

Samples were analyzed for the Streamlined Approach for Environmental Restoration (SAFER) Plan-specified COPCs, which included total VOCs, total SVOCs, total RCRA metals, TPH (DRO and GRO), isotopic U, isotopic Pu, and gamma spectroscopy; and for PCBs, which were not required by the SAFER Plan. Total petroleum hydrocarbons were the only COPC detected above PALs, except for arsenic. Two samples and the field duplicate exceeded the TPH PAL of 100 mg/kg, and TPH was determined to be a COC. The concentration of TPH ranged from 160 to 200 mg/kg. No VOCs or SVOCs were detected above PALs. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR (NNSA/NV, 2002a).

Table 16-1 contains analytical results of all COCs at CAS 03-09-04 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 16-1**  
**Sample Results for COCs at CAS 03-09-04**  
**Used To Establish Current Use Restriction**

Sample ID	Sample Location	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
356050	Point of maximum accumulation	0.9 - 1.4	160
356051	Surface at point of maximum accumulation	0.0 - 0.5	170
356069 (FD of 356051)	Surface at point of maximum accumulation	0.0 - 0.5	200

bgs = Below ground surface  
DRO = Diesel-range organics  
FD = Field duplicate  
ft = Foot

ID = Identification  
mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

#### **16.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NV, 2002a). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **16.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this site.

## **17.0 CAU 358, Areas 18, 19, 20 Cellars/Mud Pits**

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### **17.1 CAS Descriptions**

Corrective Action Unit 358 has 17 CASs, eight of which have associated URs. Modifications to URs are proposed for the following seven URs at CAU 358 CASs located in Area 20 of the NTS:

- CAS 20-23-02 - Postshot Cellar
- CAS 20-23-03 - Cellar
- CAS 20-23-04 - Postshot Cellar
- CAS 20-23-05 - Postshot Cellar
- CAS 20-23-06 - Cellar
- CAS 20-37-01 - Cellar & Mud Pit
- CAS 20-37-05 - Cellar

Corrective Action Site 20-23-02 is an open post-test cellar that is 9 ft deep. The cellar floor contains an unknown amount of soil with small amounts of organic material and possible drilling material. A stand pipe protrudes out the top of the cellar. The walls of the cellar are lined with corrugated steel. The cellar is posted as an “Underground Material” (URMA) (NNSA/NSO, 2003h).

Corrective Action Site 20-23-03 is the U-20az open post-test cellar. The cellar floor contains an unknown amount of dark soil with small amounts of organic material and possible drilling material. The walls of the cellar are lined with corrugated steel. The cellar is approximately 12 ft deep and is posted as “Caution Cellar 20az” (NNSA/NSO, 2003h).

Corrective Action Site 20-23-04 is a post-test cellar that was backfilled with soil/gravel. The approximate depth of the cellar is 14.5 ft with a diameter of 9 ft. Protruding from the backfill is a metal posting identifying the cellar as “U-20am Postshot” (NNSA/NSO, 2003h).

Corrective Action Site 20-23-05 is located approximately 450 ft southwest of U-20ab. This CAS is a post-test cellar that is open. The cellar floor contains an unknown amount of soil with small amounts of organic material and possible drilling material, and a standpipe protrudes from the top of the cellar. The walls of the cellar are lined with corrugated steel. The cellar is 10 ft deep and is posted as an “URMA” (NNSA/NSO, 2003h).

Corrective Action Site 20-23-06 is located to the west of U-20ac. This post-test cellar is open and is approximately 9 ft deep. The cellar floor contains an unknown amount of soil with small amounts of organic material and possible drilling material. A stand pipe is located within the

cellar and the walls are lined with corrugated steel. The cellar is posted as an URMA (NNSA/NSO, 2003h).

Corrective Action Site 20-37-01 is located 350 yards northeast of U-20aa. This CAS consists of a post-test cellar approximately 9 ft deep that is open, and a mud pit (approximately 65 by 30 ft) containing drilling mud and/or drill cuttings. The cellar floor contains an unknown amount of soil with small amounts of organic material and possible drilling material. The walls of the cellar are lined with a square metal casing. Both the cellar and mud pit are posted as an URMA (NNSA/NSO, 2003h). The cellar was listed as an active UGTA monitoring well.

Corrective Action Site 20-37-05 is an open post-test cellar approximately 12 ft deep, and has a stand pipe protruding out the top of the cellar. The cellar floor contains an unknown amount of soil with small amounts of organic material and possible drilling material. The walls of the cellar are lined with corrugated steel. The cellar is posted as an URMA (NNSA/NSO, 2003h).

### **17.2 Current Use Restriction Description**

The future use of any land affected by all URs in this CAU is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. As part of closure activities, all CAU 358 CASs were backfilled with clean fill and closed in place with a UR. The UR boundaries are defined by the corner points of existing facility demarcation fences or by the cement pad corners. The UR for CAS 20-37-01 applies to the cellar only. There are no site monitoring requirements (NNSA/NSO, 2004b).

### **17.3 Basis for Current Use Restriction**

Soil samples were collected and analyzed for VOCs, SVOCs, total RCRA metals, TPH full scan, PCBs, and gamma spectroscopy. Petroleum hydrocarbons (diesel, gasoline, oil, and TPH) were detected above the PAL of 100 mg/kg in six samples. Petroleum hydrocarbons were the only COPCs detected above action levels; no VOCs or SVOCs were detected above PALs. (NNSA/NSO, 2003h).

Table 17-1 contains analytical results of all COCs at CAU 358 that are the basis for the current URs. The sample matrix for all samples is soil.

**Table 17-1  
 Sample Results for COCs at CAU 358  
 Used To Establish Current Use Restriction**

Sample ID	Diesel	Oil	TPH
	PAL 100 mg/kg	PAL 100 mg/kg	PAL 100 mg/kg
202302-9-C1	280	2,600	2,880
202303-12-C1	430	4,900	5,330
202305-10-C1	360	2,700	3,000
202306-9-C1	--	230	248
203701-9-C1	--	250	290
203705-12-C1	--	3,700	3,735.1

ID = Identification  
 mg/kg = Milligrams per kilogram  
 PAL = Preliminary action level  
 TPH = Total petroleum hydrocarbons  
 -- = No detects above action levels

#### **17.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2003h). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **17.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this site.

## **18.0 CAU 394, CAS 12-25-04 – UST 12-16-2 Waste Oil Release**

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### **18.1 CAS Description**

Corrective Action Site 12-25-04 consists of a documented release of waste oil from underground storage tank (UST) 12-16-2 at Building 12-16. Building 12-16 was used as the light duty shop (or lube shop) for Area 12 from roughly 1965 to the early to mid-1990s when it was closed. Waste oil was accumulated and stored in UST 12-16-2 before disposal. The waste oil release was originally discovered in July 1992, when stained soil was noted in an excavation approximately 10 ft to the south and east of UST 12-16-2. This excavation was intended to be used for the construction of a concrete pad for an AST to replace UST 12-16-2. The stained soil was sampled for a full suite of analysis. Only oil was found to exceed the regulatory limits (100 mg/kg). The release was determined to have exceeded the reporting limits for hydrocarbon spills and was reported to the State of Nevada and assigned the case number H920723D. The UST 12-16-2 was removed from the ground on October 12, 1992 (NNSA/NV, 2001e).

### **18.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is for subsurface contamination. Two UR signs, each mounted on a permanent post/pole, were placed around the contamination. There are no monitoring or inspection requirements associated with this UR (NNSA/NSO, 2003d).

### **18.3 Basis for Current Use Restriction**

Fourteen soil samples were collected and analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), and PCBs. Arsenic and TPH (DRO) were the only contaminants with concentrations exceeding PALs. The concentrations of arsenic were above the PAL but within the range considered representative of ambient conditions at the site; therefore, arsenic is not considered to be a basis for this UR. Total petroleum hydrocarbons concentrations exceeded the PAL of 100 mg/kg in three samples. No VOCs or SVOCs were detected above PALs (NNSA/NSO, 2003d).

Sampling in the center of the backfilled excavation indicated that there were concentrations of TPH (DRO) that exceeded the PAL at a depth of 6 ft bgs. Samples confirm that the extent of



contamination does not extend laterally beyond 30 ft north and 35 ft south of the center of the excavation. Contamination does not appear to be present below 20 ft bgs. The source of the release has been removed (NNSA/NSO, 2003d).

Table 18-1 contains analytical results of all COCs at CAS 12-25-04 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 18-1**  
**Sample Results for COCs at CAS 12-25-04**  
**Used To Establish Current Use Restriction**

Sample ID	Sample Location	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
394A002	Borehole 12250401	5.5 - 6	780 (J)
394A009	Borehole 12250403	8 - 8.5	200
394A010 (FD of 394A009)	Borehole 12250403	8 - 8.5	220

bgs = Below ground surface  
DRO = Diesel-range organics  
FD = Field duplicate  
J = Estimated value

ft = Foot  
ID = Identification  
mg/kg = Milligrams per kilogram  
TPH = Total petroleum hydrocarbons

#### **18.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2003d). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **18.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this site.

## **19.0 CAU 394, CAS 18-25-01 – Oil Spills**

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### **19.1 CAS Description**

Corrective Action Site 18-25-01 consists of spills of oil and fuel (both gasoline and diesel) that were associated with the Area 18 Camp Gas Station. This site was recorded during the original inventory of inactive and abandoned waste sites at the NTS in 1991. The original site inventory form describes the site as “copious oil spills, various sizes, located near and around the old Gas Station 17 Camp” (NNSA/NV, 2001e).

Engineering drawings indicate the service station was in operation by 1964 or 1965. It is unknown when operations ceased. The USTs for this gas station were originally located southwest of the service station and are not included in the scope of this CAS (NNSA/NV, 2001e).

Surface conditions at the site in 2001 consisted of areas of gravel and weathered asphalt, areas of sediment from a flood event (erosion of the site appeared to be limited), and several concrete pads and the pump islands. It could not be determined during the 2001 site visit whether there is an intact layer of asphalt at the site. Individual stains were not identifiable in available pictures or during site visits (NNSA/NV, 2001e).

### **19.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is for subsurface contamination. A single UR sign was mounted on a permanent post/pole and placed at a select location within the CAS. There are no monitoring or inspection requirements associated with this UR (NNSA/NSO, 2003d).

### **19.3 Basis for Current Use Restriction**

Twenty-three soil samples were collected from 15 locations and analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), PCBs, gamma spectroscopy, isotopic U, and isotopic Pu. Three sample results exceeded the PAL for TPH of 100 mg/kg. Sample 394B004 was collected from the borehole located northwest of the gasoline pump island. Samples 394B006 and 394B007 were collected from the northeast and southeast boreholes of the diesel pump island. All three samples were collected at 3 to 4 ft bgs. Total petroleum hydrocarbons were not

detected at concentrations exceeding the PAL below 4 ft bgs. Concentrations of TPH (DRO) were not detected in soil samples exceeding the PAL in lateral step-out samples. No VOCs or SVOCs were detected above PALs, and no other COPCs were detected at levels exceeding the PALs (NNSA/NSO, 2003d).

Table 19-1 contains analytical results of all COCs at CAS 18-25-01 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 19-1**  
**Sample Results for COCs at CAS 18-25-01**  
**Used To Establish Current Use Restriction**

Sample ID	Sample Location	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
394B004	Borehole 18250104	3 - 4	260
394B006	Borehole 18250106	3 - 4	110
394B007	Borehole 18250107	3 - 4	220

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

#### **19.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in Section 2.2.2. Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2003d). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **19.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this CAS.

## ***20.0 CAU 394, CAS 18-25-02 – Oil Spills, and CAS 18-25-03 – Oil Spill***

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### ***20.1 CAS Descriptions***

Corrective Action Site 18-25-02 consists of contaminated gravel and soil at the location of a former generator shack at the Area 18 Camp. This site was recorded during the original inventory of inactive and abandoned waste sites at the NTS in 1991. The original site inventory form describes the site as “large area of oil spilled on the ground inside the old generator shack (17 Camp).” No engineering drawings or other historical documentation could be found for this building other than those that describe it simply as a generator shack. It appears the shack was in operation by 1964 or 1965, ceased before 1970, and was demolished sometime between 1993 and 1997. The curbing for the foundation is still in place as are several concrete pads within the curbing. The remaining area inside the curbing is filled with pea gravel; some areas of which are darkly stained. It is unknown whether there is a solid concrete foundation under the pea gravel (NNSA/NV, 2001e).

Corrective Action Site 18-25-03 consists of contaminated soil at the former location of an AST. The AST was used to store diesel fuel to run a generator(s) at the Area 18 Control Point. This CAS is located approximately 10 to 20 ft north of CAS 18-25-02. The site is described as “oil spill approximately 6 to 8 ft<sup>2</sup> located under the aboveground fuel tank, about 300-gallon (gal) capacity, adjacent to the old generator shack.” The dates of operation of this tank are assumed to be the same as those of the generator shack. The AST was removed sometime between 1991 and 1997 (NNSA/NV, 2001e).

A PCB- and TPH-contaminated area encompassing both sites was removed and verification samples were collected and analyzed to verify removal of the contamination. Analytical results from the verification samples indicated that PCBs exceeding the PAL were removed, but TPH contamination remained above the PAL. The remaining TPH contamination was closed in place with one UR applying to both CASs 18-25-02 and 18-25-03 (NNSA/NSO, 2003d).

### ***20.2 Current Use Restriction Description***

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is for subsurface contamination. Two sides of the combined area are bounded by chain-link fencing. Two UR signs, each mounted on a permanent post/pole, are placed at the

unfenced sides of the CASs. There are no monitoring or inspection requirements associated with this UR (NNSA/NSO, 2003d).

### **20.3 Basis for Current Use Restriction**

Samples from CAS 18-25-02 were analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), and PCBs. Samples from CAS 18-25-03 were analyzed for gamma spectroscopy, isotopic U, isotopic Pu, VOCs, SVOCs, RCRA metals, TPH (DRO), and PCBs. Sampling of the material remaining (following remediation) indicated that concentrations of TPH (DRO) exceeded the PAL of 100 mg/kg at seven locations. On four sides of the excavation, samples were taken at depth to determine whether there has been any lateral migration of TPH (DRO). In addition, a soil boring was advanced in the excavation to determine the depth of contamination of TPH (DRO). The samples at depth and on the four sides of the excavation indicated that the remaining TPH-DRO and -GRO contamination is bounded within the CAS boundaries and by the underlying welded tuff bedrock. No VOCs or SVOCs were detected above PALs. Concentrations of arsenic above the PAL of 2.7 mg/kg were also found in samples. However, these concentrations are within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. Levels of all other contaminants were below the PALs (NNSA/NSO, 2003d).

Table 20-1 contains analytical results of all COCs at CASs 18-25-02 and 18-25-03 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 20-1**  
**Sample Results for COCs at CASs 18-25-02 and 18-25-03**  
**Used To Establish Current Use Restriction**  
(Page 1 of 2)

Sample ID	Location/Description	Depth (ft bgs)	TPH (DRO)	TPH (GRO)
			PAL 100 mg/kg	PAL 100 mg/kg
394C085	North wall toe of slope	6 - 7	4,000 (J)	--
394C091	West wall toe of slope	3 - 4	360 (J)	--
394C094	South side (surface)	0 - 1	390 (J)	--
394C095	Floor of excavation	6 - 7	2,300 (J)	--
394C096	Floor of excavation	6 - 7	1,200 (J)	--
394C097	Bottom of excavation	6 - 7	1,700 (J)	--
394C098	Floor of excavation	6 - 7	450 (J)	--

**Table 20-1**  
**Sample Results for COCs at CASs 18-25-02 and 18-25-03**  
**Used To Establish Current Use Restriction**  
(Page 2 of 2)

Sample ID No.	Location/Description	Depth (ft bgs)	TPH (DRO)	TPH (GRO)
			PAL 100 mg/kg	PAL 100 mg/kg
394C099	Floor of excavation	6 - 7	150 (J)	--
394C100	Floor of excavation	6 - 7	100 (J)	--
394C105	Deepest point of excavation	10 - 12	16,000 (J)	--
394C121	Boring C09	9 - 10	18,000 (J)	820

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
GRO = Gasoline-range organics

ID = Identification  
mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

J = Estimated value  
-- = No detects above action levels

#### **20.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2003d). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### **20.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this CAS.

## **21.0 CAU 394, CAS 29-44-01 – Fuel Spill**

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### **21.1 CAS Description**

Corrective Action Site 29-44-01 is described as a fuel spill at the Shoshone Transmitter Site in Area 29. No information on the source or exact location of this release was provided.

A historical engineering drawing and a site visit identified two potential release sources at the Shoshone Transmitter Site, a former AST location and a soil stain (NNSA/NV, 2001e).

Historical engineering drawings indicated that there was an AST at the Shoshone Transmitter Station that was removed sometime before 1974. The AST is a potential source of a release. However, several longtime NTS employees at the site did not recall the AST ever having been at the site, or any release at the site. A site visit identified an earthen pad that appears to be in the location where the engineering drawings indicate the AST was located. The earthen pad is approximately 80 ft north of the transmitter station. There was no noted staining or odor evident in the area (NNSA/NV, 2001e).

Site visits to the Shoshone Transmitter Station also identified a hydrocarbon soil stain approximately 4 ft in diameter in the vicinity of the transmitter station. The stain is about 100 ft east of the station and is not related to the former AST location. The stain appears to be of recent origin (i.e., within the last five years) because it was first identified in 1998 and not recorded in previous site visits (NNSA/NV, 2001e).

### **21.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR is for subsurface contamination. A single UR sign was mounted on a permanent post/pole at each release site. There are no monitoring or inspection requirements associated with this UR (NNSA/NSO, 2003d).

### **21.3 Basis for Current Use Restriction**

Samples from the hydrocarbon soil stain were analyzed for VOCs, SVOCs, RCRA metals, TPH (DRO and GRO), and PCBs. Samples from the AST location were analyzed for TPH (DRO). Arsenic and TPH (DRO) were the only COPCs present at the CAS with concentrations exceeding their PALs. One sample from each location had concentrations of

TPH (DRO) above the PAL of 100 mg/kg. No VOCs or SVOCs were detected above PALs. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. Results from radiological analyses did not exceed activities greater than, or statistically distinguishable from, background activities (NNSA/NSO, 2003d).

Table 21-1 contains analytical results of all COCs at CAS 29-44-01 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 21-1**  
**Sample Results for COCs at CAS 29-44-01**  
**Used To Establish Current Use Restriction**

Sample ID	Sample Location	Depth (ft bgs)	TPH (DRO)
			PAL 100 mg/kg
394F001	West corner of AST earthen pad	0 - 0.5	110
394F009	Center of stained soil	0 - 0.5	23,000 (J)

AST = Aboveground storage tank  
bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot

ID = Identification  
mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

J = Estimated value

## 21.4 Basis for Use Restriction Modification

The revised FALs associated with the TPH contamination were established based on the PALs of the hazardous constituents of TPH as described in Section 2.2.2. Hazardous constituents of TPH diesel were not detected in the sample with the TPH result of 23,000 mg/kg at concentrations greater than their respective PALs (NNSA/NSO, 2003d). No analytical results of the hazardous constituents of TPH (DRO) were available for the sample with 110 mg/kg of TPH (DRO).

However, it is associated with the same diesel fuel spillage and there is no reasonable expectation that any constituent would exceed PALs. Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

## 21.5 Proposed Modification

Remove the FFACO UR and associated fencing and postings from this CAS.



## **22.0 CAU 398, CAS 25-25-17 – Subsurface Hydraulic Oil Spill**

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### **22.1 CAS Description**

Corrective Action Site 25-25-17 consists of a hydraulic oil spill identified on December 1, 1998, during the housekeeping closure of CAS 25-25-01 at CAU 297. Because the spill was more extensive than originally believed, CAS 25-25-17 was created. The spill occurred as a result of the continual overfilling of two 10-gal aboveground metal containers, which were used for recirculating oil in a vacuum pump oil recovery system at E-MAD Building 3900 (NNSA/NV, 2001f).

The vacuum oil recovery system was installed in approximately 1965 and operated until the early to mid-1970s. Closure of the vacuum oil recovery system was completed on December 1, 1998. Disposal of the tanks, associated piping, and the first few inches of impacted soil was performed on January 14, 1999. This release was reported to the Nevada Division of Emergency Management on January 21, 1999, as case number NDEM #99-0120-3281 (NNSA/NV, 2001f).

The spill is in a significant power/utility corridor feeding into Building 3900. The quantity of oil released to the soil was estimated to be greater than 25 gal. While excavating, utilities were identified at a depth of approximately 3 ft. Impacted soil was removed to a depth of 18 in. Work was discontinued due to the extent of the impacted area, confining work space limitations, and proximity to utilities. Clean soil was used as backfill over the excavated area (NNSA/NV, 2001f).

### **22.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The UR states: “Note, the spill site is within the Utility Corridor at E-MAD. Use restrictions apply to the area within the utility corridor.” There are no annual monitoring or inspection requirements (NNSA/NSO, 2003e).

### **22.3 Basis for Current Use Restriction**

Samples of the pre-excavation soils at the site were analyzed for TPH (diesel and oil), TCLP VOCs, TCLP SVOCs, TCLP metals, PCBs, pesticides, and gamma spectroscopy. Total petroleum hydrocarbons and PCBs were identified as COCs. Following removal of the

contaminated soils, TPH (Oil) was the only COC present exceeding the PAL of 100 mg/kg at concentrations up to 600 mg/kg. No VOCs or SVOCs were detected above PALs. Due to site conditions (e.g., location of utilities, limited space, depth to bedrock, and poor lighting) and limited access, the site was closed in place with a UR (NNSA/NSO, 2003e).

Table 22-1 contains analytical results of all COCs at CAS 25-25-17 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 22-1**  
**Sample Results for COCs at CAS 25-25-17**  
**Used To Establish Current Use Restriction**

Sample id	Depth (ft bgs)	TPH (Oil)
		PAL 100 mg/kg
252517-1-1	1	600
252517-2-1	1	530

bgs = Below ground surface  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

## **22.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (NNSA/NSO, 2003e). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

## **22.5 Proposed Modification**

Remove the FFACO UR and associated fencing and postings from this CAS.

## **23.0 CAU 404, CAS TA-03-001-TARC – Roller Coaster Lagoons, and TA-21-001-TARC – Roller Coaster N. Disposal Trench**

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### **23.1 CAS Descriptions**

The CAU consists of two separate areas: CAS TA-03-001-TARC, Roller Coaster Lagoons, and CAS TA-21-001-TARC, Roller Coaster N. Disposal Trench. Both CASs are co-located approximately 4.3 mi south of Area 3 along the Main Road South on the Tonopah Test Range (TTR). Associated with the CAU is an additional area where a small spill occurred during Voluntary Corrective Action (VCA) activities (DOE/NV, 1996).

The Roller Coaster Lagoons site consists of two large unlined sewage lagoons that received liquid sanitary wastes from the Operation Roller Coaster man camp. The man camp supported up to 600 people for approximately two months in 1963. The sanitary sewer system is approximately 120 by 75 by 10 ft. Subsequent to Operation Roller Coaster, the lagoons received debris from construction and range cleanup activities conducted on the TTR (DOE/NV, 1996).

The North Disposal Trench, located north of the eastern-most lagoon, was installed in 1963 to receive solid waste and construction debris from the Operation Roller Coaster man camp. Subsequent to Operation Roller Coaster, the trench continued to receive construction debris and range cleanup debris (including ordnance) from Sandia National Laboratories (SNL) and other operators. The trench is approximately 100 by 12 by 10 ft (DOE/NV, 1996).

A VCA operation removed ordnance and other debris from the two lagoons and trench. The debris and waste was segregated into: (1) recyclable ordnance and debris, (2) nonrecyclable debris, (3) hazardous waste, (4) suspected asbestos-containing materials, and (5) hydrocarbon-contaminated material. All items removed from the lagoons and trench, were screened for radiological contamination with handheld instruments and radiation swipes. No radiological contamination was detected (DOE/NV, 1996).

The North Disposal Trench (CAS TA-21-001-TARC) was clean closed by removal and disposal of the debris and backfilling the pit to grade (DOE/NV, 1998a).

### **23.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the

CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. The monitoring will consist of biannual visual inspections of:

- The cover for condition (e.g., subsidence, significant erosion unauthorized excavation) and plant development.
- The fence and signs to determine whether repairs are required.

Nonscheduled inspections may also be required after severe weather events such as heavy rainfall, flash flooding, and high winds. Any identified maintenance and repair requirements will be remedied within 90 days of discovery and documented in writing at the time of repair. Monitoring of the vegetative cover will be conducted during the first, third, and fifth year after revegetation. Monitoring during the first year will determine whether germination of seeded plant species has occurred. By the third year, plant establishment will be evaluated. By the fifth year, long-term survival can be predicted. Concurrently, wildlife use of the site will be evaluated with the objective of determining whether burrowing animals have moved onto the site and to what depth they might be expected to penetrate the cover. The erosion condition of the soil will be evaluated using a qualitative erosion condition classification developed by the Bureau of Land Management. Information gathered will be compared to natural conditions and will be used in assessing whether or not remedial action is necessary so that a viable vegetative cover is established (DOE/NV, 1998a).

It should be noted that the UR description includes a comment that the N. Disposal Trench was clean closed. The N. Disposal Trench is not included in the UR boundary.

### **23.3 Basis for Current Use Restriction**

Samples from this CAU were analyzed for VOCs, SVOCs, RCRA metals, TPH, and pesticides. Contaminant levels were below PALs at the N. Disposal Trench CAS; therefore, it is not included in the UR boundary (DOE/NV, 1997). In both the East and West Lagoons, dichlorodiphenyl-dichlorethylene (DDE), dichlorodiphenyl-trichloroethane (DDT), and dichlorodiphenyl-dichloroethane (DDD) concentrations were identified in the surface soil samples above residential PRGs. In the West Lagoon, DDE and DDT concentrations exceeded industrial PRGs.

Table 23-1 contains analytical results of all COCs at CAU 404 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 23-1  
Sample Results for COCs at CAU 404  
Used To Establish Current Use Restriction**

Sample ID	Lagoon	DDD	DDE	DDT
		Residential Soil PRGs		
		1,851 µg/kg	1,307 µg/kg	1,307 µg/kg
		Industrial Soil PRGs		
		7,948 µg/kg	5,610 µg/kg	5,610 µg/kg
TTR00084	West	--	2,200	2,500
TTR00087	West	3,800	3,500	9,900
TTR00095	West	2,300	8,400	7,900
TTR00113	West	5,400	15,000	14,000
TTR00076	East	--	--	1,900
TTR00077	East	--	1,600	2,600

DDD = Dichlorodiphenyl-dichloroethane  
DDE = Dichlorodiphenyl-dichlorethylene  
DDT = Dichlorodiphenyl-trichloroethane

ID = Identification  
PRG = Preliminary remediation goal  
µg/kg = Micrograms per kilogram

-- = No detects above action levels

### **23.4 Basis for Use Restriction Modification**

The revised FALs for DDE, DDT, and DDD as listed in Table 20-2 were established using the Tier 2-based FAL process as presented in [Section 2.2.2](#). These FALs were calculated using the Remote Work Area site-specific exposure scenario. This scenario assumes that a worker will be exposed to the site contaminants for 336 hours per year for 25 years (a total exposure equivalent of 1,050 work days). This exposure scenario is for remote work sites that are not occupied during normal work assignments but where workers may occasionally be sent to perform work (NNSA/NSO, 2006c). Because CAS TA-03-001-TARC, Roller Coaster Lagoons, and CAS TA-21-001-TARC, Roller Coaster N. Disposal Trench, are both located in an inactive area approximately 4.3 mi south of any industrial type sites (Area 3), no current or foreseeable future activities would cause any worker to be exposed to this site for a period of time exceeding that assumed in the remote work area scenario (i.e., 336 hours per year for 25 years).

The UR modification would be to remove CAS TA-21-001-TARC, Roller Coaster N. Disposal Trench, from the UR and to implement an administrative UR for the East and West Lagoons as described in [Section 2.0](#). This administrative UR would restrict any activity that would result in any worker being within the UR boundary for a lifetime-duration of more than 1,050 total workdays.

Table 23-2 presents the sample results that are the basis for the current UR and demonstrate that none exceed the revised FALs (based on a Remote Work Area land use scenario).

**Table 23-2**  
**Revised Final Action Levels for CAU 404**

Sample ID	Lagoon	DDD	DDE	DDT
		Revised FALs 33,900 µg/kg	Revised FALs 23,900 µg/kg	Revised FALs 21,400 µg/kg
TTR00084	West	--	2,200	2,500
TTR00087	West	3,800	3,500	9,900
TTR00095	West	2,300	8,400	7,900
TTR00113	West	5,400	15,000	14,000
TTR00076	East	--	--	1,900
TTR00077	East	--	1,600	2,600

DDD = Dichlorodiphenyl-dichloroethane  
DDE = Dichlorodiphenyl-dichlorethylene  
DDT = Dichlorodiphenyl-trichloroethane

ID = Identification  
FAL = Final action level  
µg/kg = Micrograms per kilogram

-- = No detects above original action levels

### **23.5 Proposed Modification**

Implement an administrative UR for the East and West Lagoons as described in [Section 2.0](#) restricting any activity that would result in any worker being within the UR boundary for a lifetime-duration of more than 1,050 total work days. Remove all fencing and postings as well as inspection and maintenance requirements. Remove the N. Disposal Trench from any UR because it was clean closed and contaminant levels were below PALs.

## ***24.0 CAU 423, CAS 03-02-002-0308 – Underground Discharge Point***

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### ***24.1 CAS Description***

Corrective Action Unit 423 consists of one CAS located in Area 3 at the TTR. Corrective Action Site 03-02-002-0308 consists of the Underground Discharge Point (UDP) and its associated discharge pipeline extending from Building 03-60, the Auto Maintenance Shop. From approximately 1965 to 1990, the gravity-fed discharge pipeline carried waste oil and other shop products to the UDP. The UDP is 240 ft northwest of the northwest corner of Building 03-60 and is adjacent to a barbed-wire fence near the southwest corner of the Area 3 Boxcar Storage Yard. The UDP consists of a 3.5-ft diameter corrugated metal culvert pipe, which is set vertically in the ground at a depth of 1.5 ft bgs (DOE/NV, 1999a).

### ***24.2 Current Use Restriction Description***

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. An asymmetrical petroleum hydrocarbon plume, measuring 35 ft in length, 20 ft in width, and 14 to 65 ft in depth, has formed beneath the UDP and migrated westward. A UR was implemented restricting excavation of the area, including the removal of Building 03-60, or excavation of areas impacted by the UDP petroleum hydrocarbon plume, including the discharge pipe leading from Building 03-60. Post-closure monitoring is required and consists of biannual inspections and an annual report containing the inspection checklists (DOE/NV, 1999a).

### ***24.3 Basis for Current Use Restriction***

A total of 38 soil samples were collected and submitted for laboratory analysis. Samples were analyzed for total VOCs, total SVOCs, total PCBs, total RCRA metals, and TPH (diesel and gasoline). A plume of TPH greater than the PAL of 100 mg/kg was identified with a maximum dimension of 6 by 11 m and ranges in depth from a minimum of 4 to 20 m. The plume is asymmetric and primarily west of and below the UDP. With the exception of arsenic, the PALs were not exceeded for total VOCs, total SVOCs, total PCBs, and total RCRA metals for any of the samples collected from the subsurface at the Building 03-60 UDP site. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR.

Radiological field screening did not detect radiation that was distinguishable from background activities (DOE/NV, 1998b).

Table 24-1 contains analytical results of all COCs at CAS 03-02-002-0308 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 24-1**  
**Sample Results for COCs at CAS 03-02-002-0308**  
**Used To Establish Current Use Restriction**

Borehole No.	Sample ID	Sample Depth (ft bgs)	TPH (DRO)	TPH (GRO)
			PAL 100 mg/kg	PAL 100 mg/kg
B1	TTR01103	30	2,000	560
B1	TTR01104	45	1,700	430
B6	TTR01131	20	2,400	640
B6	TTR01132	30	1,400	550
B6	TTR01133	45	1,400	670
B6	TTR01134	60	1,800	760 (J)
B6	TTR01137	90	--	1,400
B8	TTR01147	35	110	--
B8	TTR01149	60	520	--

bgs = Below ground surface  
DRO = Diesel-range organics  
ft = Foot  
GRO = Gasoline-range organics

ID = Identification  
mg/kg = Milligrams per kilogram  
PAL = Preliminary action level  
TPH = Total petroleum hydrocarbons

J = Estimated value  
-- = No detects above action levels

#### **24.4 Basis for Use Restriction Modification**

The UR included both the UDP and the associated piping based on the characterization sample results from the UDP. Because piping discharged directly into the UDP, it is reasonable to assume that even if there was any leakage from the piping, contaminants concentrations from any potential piping leak would not exceed concentrations found in the UDP. The samples with the maximum concentrations of TPH from the UDP have no TPH-related contaminant concentrations above their corresponding PALs.

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective



PALs (DOE/NV, 1998b). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

#### ***24.5 Proposed Modification***

Remove the FFACO UR, associated fencing and postings, and monitoring requirements from this site.

## **25.0 CAU 427, Area 3 Septic Waste Systems 2, 6 (TTR)**

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### **25.1 CAS Descriptions**

Corrective Action Unit 427 is comprised of the following two CASs located in Area 3 of the TTR:

- CAS 03-05-002-SW02, Septic Waste System
- CAS 03-05-002-SW06, Septic Waste System

The septic waste systems (located within the southwest portion of the Area 3 Compound) were installed to receive sanitary and industrial liquid wastes generated from site maintenance and other daily operations conducted at the Area 3 Compound. Corrective Action Site 03-05-002-SW02 and CAS 03-05-002-SW06 will be referred to as Septic Waste System (SWS) 2 and 6 respectively. Septic Waste System 2 and 6 were in operation during different time intervals from 1960 through 1990. Process knowledge of early septic operations regarding disposal practices and composition of waste streams is limited (DOE/NV, 1998c).

The components associated with SWS 2 are the distal end of 1965-1975 leachfield; southern leg of post-1975 leachfield; outfall ends of tanks 33-6 and 33-12; leach beds and drainage ends of the central and northern legs and the distribution box associated with post-1975 leachfield; fork associated with 1965-1975 leachfield; and outfall end of septic tank 33-4. The 1965-1975 leachfield received liquid wastes from all of the contributing SWS 2 and SWS 6 discharge sources during this time period. The post-1975 leachfield was operational until the SNL-consolidated sewer upgrade effectively eliminated the discrete systems that had been in use in the Area 3 Compound (DOE/NV, 1998c).

The component associated with SWS 6 is the pre-1965 leachfield. This is the earliest of the three leachfields at CAU 427 and was installed with the apparent intent to receive liquid wastes from Building 03-60 from 1960 through 1965. A video survey of the active line from Building 03-60 showed no tie-ins, off-shoots, or other irregularities (DOE/NV, 1998c).

### **25.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance (DOE/NV, 1999b).

Subsurface metal plates were placed at the corners of each use restricted area to simplify boundary detection (using a magnetometer or equivalent) while minimizing marker deterioration due to placement in high-traffic areas. The need for unobstructed road access prompted the placement of warning signs in low-traffic areas and subsurface boundary markers (1 ft bgs) in high-traffic areas (DOE/NV, 1999b).

Annual inspections were to be performed for five years after the completion of closure activities, and documented on inspection forms. Site inspections will document indications of subsidence, erosion, and unauthorized use of soil and asphalt covers. Inspections will document the condition of markers and warning signs. Site monitoring will be used to determine whether maintenance, repairs, and/or modifications to UR administrative controls are needed and/or if termination of post-closure inspections can be proposed (DOE/NV, 1999b). Although no longer required, annual monitoring is still conducted at the site as a BMP (Murphy, 2006).

### **25.3 Basis for Current Use Restriction**

Samples collected from the Area 3 SWS 2 and 6 were submitted for total VOCs, total SVOCs, TPH (gasoline and diesel/waste oil), total RCRA metals, total PCBs, and gamma spectroscopy analyses. Results from these analyses identified TPH (waste oil) and arsenic as the only contaminants exceeding PALs. The concentrations of arsenic above the PAL of 2.7 mg/kg were within the range considered representative of ambient conditions at the site. Therefore, arsenic is not considered to be a basis for this UR. Radiological results from the samples collected from SWS 2 and 6 locations did not exceed PALs (radiation distinguishable from background activities). Of 120 samples, 15 contained TPH as waste oil at concentrations above the PAL of 100 mg/kg. These concentrations are associated with the northern and central distribution lines and the distribution box of the post-1975 leachfield, the proximal end of the 1965-1975 leachfield, and the outfall end of septic tank 33-4. Total petroleum hydrocarbons concentrations above the PAL of 100 mg/kg are limited laterally to the confines of the two discovered leach systems and have exhibited a low degree of vertical migration, with very few elevated levels, at depths up to 27.5 ft bgs. No VOCs or SVOCs were detected above PALs (DOE/NV, 1998c).

Table 25-1 contains analytical results of all COCs at CAU 427 that are the basis for the current UR. The sample matrix for all samples is soil.

**Table 25-1  
Sample Results for COCs at CAU 427  
Used To Establish Current Use Restriction**

Sample Location/Borehole	Sample ID	Sample Depth (ft bgs)	Waste Oil
			PAL 100 mg/kg
LF1-T1	TTR00867	4.6	120
LF2-T1 & LF2-T1-Cutback	TTR00871	5.5	2,400
	TTR00874	6.0	1,600
	TTR00878	10.0	680
LF3-T1	TTR00885	5.5	370
LF4-T1	TTR00887	6.0	230
	TTR00898	7.0	1,500
Tank 33-4	TTR00929	5.0	2,900
Tank 33-4-SB	TTR00945	10.0	1,300
LF4-DBOX-SB	TTR00966	7.5	560
LF4-T1-20.0SEEP-SB	TTR00975	10.0	140
LF4-T1-40.0SEEP(U/G)-SB	TTR00990	12.5	180
	TTR00991	17.5	330
	TTR00993	27.5	1,100
Tank 33-5	TTR0931, TTR0933	7.4	610

bgs = Below ground surface  
ft = Foot  
ID = Identification

mg/kg = Milligrams per kilogram  
PAL = Preliminary action level

## **25.4 Basis for Use Restriction Modification**

The revised FALs associated with the TPH contamination were established based on the PALs of hazardous constituents of TPH diesel as described in [Section 2.2.2](#). Hazardous constituents of TPH diesel were not detected in any of the samples at concentrations greater than their respective PALs (DOE/NV, 1998c). Therefore, no contaminants are present at this site in concentrations exceeding the revised FALs, and all revised FALs were established at the PAL concentrations.

## **25.5 Proposed Modification**

Remove the FFACO UR, associated fencing and postings, and inspection and maintenance requirements from this site.

## **26.0 CAU 429, CAS 03-51-001-0355 – Photo Shop UDP, Drains**

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### **26.1 CAS Description**

Process knowledge indicates that potentially contaminated effluent was discharged to UDPs at CAU 429 from various operations at the TTR. The UDPs are subgrade shallow dry wells or excavations filled with gravel. Effluent was discharged to the UDPs through drainage pipes and allowed to percolate into the surrounding soil. Soils surrounding UDPs have likely been impacted by wastewater containing chemicals associated with maintenance (e.g., hydrocarbons or solvents) and/or photo-processing operations (e.g., silver) (DOE/NV, 2000b).

The Area 3 Photoshop (Building 03-55) UDPs were located in the southeast corner of the Area 3 compound. The configuration of each UDP varied. The primary UDP (B1-0355) consisted of a 3-ft-diameter, corrugated steel lining with an overflow pipe located approximately 1.5 ft bgs. The secondary UDP (B2-0355) had a void space to 8 ft bgs, which was backfilled before drilling. The actual depth of the steel lining for both UDPs was not confirmed. The original discharge pipe from Building 03-55 to the primary UDP was rerouted 15 ft south of Building 03-55. The remaining length of pipe appears to be intact and was identified as 4-in. diameter transite pipe located approximately 3 ft bgs (DOE/NV, 2000b).

### **26.2 Current Use Restriction Description**

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. There are no site monitoring requirements. The CAS 03-51-001-0355 UR is for future utilization for residential purposes. There are no restrictions for future industrial activities (e.g., excavation for utility installation or maintenance) at the site (DOE/NV, 2000b).

### **26.3 Basis for Current Use Restriction**

Samples were analyzed for total VOCs, total SVOCs, and total RCRA metals. In addition, select samples were analyzed for TCLP-silver and isotopic U. All concentrations of VOCs and SVOCs in soil samples were below the PALs at both CASs. All concentrations of total RCRA metals in soil samples were below PALs established in the CAIP (DOE/NV, 1999d) except for arsenic. Although the concentrations of arsenic exceeded the PAL of 3.0 mg/kg, the concentrations are considered representative of ambient conditions for the TTR. Therefore, arsenic is not

considered to be a basis for this UR. Radiological results for soil samples are not considered to be statistically different from their respective established background levels and, therefore, are below PALs.

Although all results were less than their respective PALs, it was requested that a UR be put in place because the silver concentration exceeded residential PRGs (based on a silver concentration of 2,900 ppm at 27 to 28 ft bgs exceeding the residential PRG of 390 mg/kg) (DOE/NV, 2000b).

#### ***26.4 Basis for Use Restriction Modification***

As current action levels are based on industrial PALs, described in [Section 2.2](#), all silver results from this CAS are below the revised PAL of 9,400 mg/kg (DOE/NV, 2000b). Therefore, no contaminants are present at this site in concentrations exceeding PALs, and the revised FALs were established at the PAL concentrations.

#### ***26.5 Proposed Modification***

Remove the FFACO UR and associated fencing and postings from this site.

## ***27.0 CAU 454, CAS 12-25-09, Spill 960722-02 (from UST 12-B-3)***

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### ***27.1 CAS Description***

The UST 12-B-3 was located west of the main portal entrance to B-Tunnel. The tank was located on top of an abandoned bunker facility constructed into the mountainside. The tank had an approximate capacity of 1,900 liters (500 gal), was empty at the time of identification, and was removed on May 6, 1996. One sample collected from below the tank bottom during excavation had a TPH concentration of 310 mg/kg, as waste oil; but upon exposing the tank, it was discovered that it was constructed of galvanized steel and was most likely used to store water. In addition, the tank interior was observed to be clean and had no evidence of being used to store fuel or oil. Further investigation of the site suggested that, because the tank was located on top of a bunker complex, the source of the oil hydrocarbons may be from an oil sealant of the structure exterior or from wooden supports identified in the excavation bottom (DOE/NV, 1998d).

### ***27.2 Current Use Restriction Description***

The future use of any land affected by this UR is restricted from any DOE or Air Force activity that may alter or modify the containment control, as approved by the state and identified in the CAU CR or other CAU documentation, unless appropriate concurrence is obtained in advance. There are no site monitoring requirements (Lawrence, 2000). There is a larger UR (for CASs 12-01-09, 12-06-05, 12-06-07, and 12-06-08) that encompasses this UR.

### ***27.3 Basis for Current Use Restriction***

Five soil samples were taken from the site and analyzed for TPH (oil). The current UR is based on one sample with a TPH (oil) concentration of 120 mg/kg, exceeding the 100 mg/kg PAL (DOE/NV, 1998d).

### ***27.4 Basis for Use Restriction Modification***

Upon removal of this UR, the larger UR (for CASs 12-01-09, 12-06-05, 12-06-07, and 12-06-08) that encompasses this UR, will remain in place and will prevent inadvertent entry into the area covered by this UR.

### ***27.5 Proposed Modification***

Remove the FFACO UR from this site, but leave the larger UR (for CASs 12-01-09, 12-06-05, 12-06-07, and 12-06-08) that encompasses the FFACO UR.

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## **Appendix A**

### **Nevada Division of Environmental Protection Comment Responses**

(2 Pages)

# NEVADA ENVIRONMENTAL RESTORATION PROJECT

## DOCUMENT REVIEW SHEET

<b>1. Document Title/Number:</b> Draft Draft Recommendations and Justifications for Modifications for Use Restrictions Established under the U.S. Department of Energy, National Nuclear Security Administration, Nevada Site Office, Federal Facility Agreement and Consent Order, Revision 0, December 2007	<b>2. Document Date:</b> 01/18/2008
<b>3. Revision Number:</b> 0	<b>4. Originator/Organization:</b> Stoller-Navarro
<b>5. Responsible NNSA/NV ERP Project Manager:</b> Kevin J. Cabbie	<b>6. Date Comments Due:</b> 01/17/2008
<b>7. Review Criteria:</b> Full	
<b>8. Reviewer/Organization/Phone No:</b> Don Elle and Jeff MacDougall, NDEP, 486-2850	
<b>9. Reviewer's Signature:</b>	

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1.) General	Mandatory	This report includes mention of only those CASs that have Use Restrictions. Some of the CAUs involved have other CASs within their scope that will not be examined or have their Use Restrictions modified. A review of the Closure Report is necessary for each of the CASs involved in the study in order to insure that consistency is maintained, i.e. Why was the level of contamination left in place? Was there a reason that might extend to other CASs within the CAU.	<p>Agree. Section 1.0, Purpose, was replaced with the following text:</p> <p>"Many Federal Facility Agreement and Consent Order (FFACO) Use Restrictions (URs) have been established at various corrective action sites (CASs) as part of FFACO corrective actions (FFACO, 1996; as amended January 2007). Since the signing of the FFACO in 1996, practices and procedures relating to the implementation of risk-based corrective action (RBCA) have evolved. This document is part of an effort to re-evaluate all FFACO URs against the current RBCA criteria (referred to in this document as the Industrial Sites [IS] RBCA process) as defined in the Industrial Sites Project Establishment of Final Action Levels (NNSA/NSO, 2006c). Based on this evaluation, the URs were sorted into the following categories:</p>	



# NEVADA ENVIRONMENTAL RESTORATION PROJECT

## DOCUMENT REVIEW SHEET

10. Comment Number/Location	11. Type*	12. Comment	13. Comment Response	14. Accept
1.) (continued)	Mandatory		<p>1. Where sufficient information exists to determine that the current UR is consistent with the RCBA criteria</p> <p>2. Where sufficient information exists to determine that the current UR may be removed or downgraded based on RCBA criteria.</p> <p>3. Where sufficient information does not exist to evaluate the current UR against the RCBA criteria.</p> <p>After reviewing all the existing FFACO URs, the 49 URs addressed in this document have sufficient information to determine that these current URs may be removed or downgraded based on RCBA criteria. This document presents recommendations on modifications to existing URs that will be consistent with the RCBA criteria."</p> <p>NOTE: This comment was also applied to the document, Supplemental Investigation Plan for FFACO Use Restrictions.</p>	
2.) General	Mandatory	In addition, all new sampling must be carried out as close as possible to the contamination found in the original investigation.	<p>No new sampling is proposed in this document as sufficient information is already available to compare to the RCBA criteria. The stated objective in the SIP document is that:</p> <p>"supplemental investigations described are limited to collecting information about the potentially hazardous constituents of TPH, from the areas previously defined, as containing the highest concentration of TPH. Based on results from previous investigations at these sites.....Areas with the highest TPH contamination are well documented and/or biasing factors exist to ensure sampling is conducted in the areas where maximum concentrations are expected."</p>	

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